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THE NEW INTERNATIONAL ENCYCLOPÆDIA

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KEY TO PRONUNCIATION.

ā as in ale, fate. Also see ĕ, below.
ȧ " " senate, chaotic. Also see ĕ, below.
â " " glare, care.
ă " " am, at.
ä " " arm, father.
à " " ant, and final *a* in America, armada, etc. In rapid speech this vowel readily becomes more or less obscured and like the neutral vowel or a short u (ŭ).
a " " final, regal, where it is of a neutral or obscure quality.
a " " all, fall.
ē " " eve.
ē̇ " " elate, evade.
ĕ " " end, pet. The characters *ĕ*, *ū*, and *ȧ* are used for *ä* in German, as in Gärtner, Gräfe, Hähnel, to the values of which they are the nearest English vowel sounds. The sound of Swedish *ä* is also indicated by *ĕ*.
ẽ " " fern, her, and as *i* in sir. Also for *ö*, *oe*, in German, as in Göthe, Goethe, Ortel, Oertel, and for *eu* and *oeu* in French, as in Neufchâtel, Crèvecœur; to which it is the nearest English vowel sound.
e " " agency, judgment, where it is of a neutral or obscure quality.
ī " " ice, quiet.
i̇ " " quiescent.
ĭ " " ill, fit.
ō " " old, sober.
ȯ " " obey, sobriety.
ô " " orb, nor.
ŏ " " odd, forest, not.
o " " atom, carol, where it has a neutral or obscure quality.
oi " " oil, boil, and for *eu* in German, as in Feuerbach.
ōō " " food, fool, and as *u* in rude, rule.
ou " " house, mouse.
ū " " use, mule.
ū̇ " " unite.
ŭ " " cut, but.
u " " full, put, or as *oo* in foot, book. Also for *ü* in German, as in München, Müller, and *u* in French, as in Buchez, Budé; to which it is the nearest English vowel sound.
ū " " urn, burn.
y " " yet, yield.
B " " the Spanish Habana, Cordoba, where it is like a *v* made with the lips alone, instead of with the teeth and lips.
ch " " chair, cheese.
D as in the Spanish Almodovar, pulgada, where it is nearly like *th* in English then, this.
g " " go, get.
G " " the German Landtag, and *ch* in Feuerbach, buch; where it is a guttural sound made with the back part of the tongue raised toward the soft palate, as in the sound made in clearing the throat.
H " " *j* in the Spanish Jijona, *g* in the Spanish gila; where it is a fricative somewhat resembling the sound of *h* in English hue or *y* in yet, but stronger.
hw " " *wh* in which.
K " " *ch* in the German ich, Albrecht, and *g* in the German Arensberg, Mecklenburg; where it is a fricative sound made between the tongue and the hard palate toward which the tongue is raised. It resembles the sound of *h* in hue, or *y* in yet; or the sound made by beginning to pronounce a *k*, but not completing the stoppage of the breath. The character K is also used to indicate the rough aspirates or fricatives of some of the Oriental languages, as of kh in the word Khan.
n " " sinker, longer.
ng " " sing, long.
N " " the French bon, Bourbon, and *m* in the French Etampes; where it is equivalent to a nasalizing of the preceding vowel. This effect is approximately produced by attempting to pronounce 'onion' without touching the tip of the tongue to the roof of the mouth. The corresponding nasal of Portuguese is also indicated by N, as in the case of São Antão.
sh " " shine, shut.
th " " thrust, thin.
TH " " then, this.
zh " " *z* in azure, and *s* in pleasure.

An apostrophe, or superior comma, ['] is sometimes used to denote a glide or neutral connecting vowel, as in tā'b'l (table), kāz''m (chasm).

Otherwise than as noted above, the letters used in the respellings for pronunciation are to receive their ordinary English sounds.

When the pronunciation is sufficiently shown by indicating the accented syllables, this is done without respelling; as in the case of very common English words, and words which are so spelled as to insure their correct pronunciation if they are correctly accented. See the article on PRONUNCIATION.

A PARTIAL LIST OF THE LEADING ARTICLES IN VOLUME IX.

GOSPEL.
Professor Melanchthon W. Jacobus.

GOTHIC ARCHITECTURE.
Professor Arthur L. Frothingham.

GOVERNMENT.
Professor George W. Kirchwey.

GRAFTING.
Dr. Alfred Charles True.

GRANITE.
Professor William Herbert Hobbs.

GRANT, U. S.
Dr. Harry A. Cushing.

GRASSES.
Dr. Alfred Charles True.

GREAT BRITAIN.
Mr. Cyrus C. Adams and others.

GREECE.
Mr. Cyrus C. Adams, Professor James Morton Paton, Professor Clifford Herschel Moore, and others.

GREEK ART.
Professor James Morton Paton.

GREEK CHURCH.
Dr. James J. Walsh.

GREEK LANGUAGE.
Professor Clifford Herschel Moore.

GREEK LITERATURE.
Professor Clifford Herschel Moore.

GREENLAND.
Mr. Cyrus C. Adams.

GRINDING AND CRUSHING.
Mr. Charles Shattuck Hill.

GROWTH.
Professor Alpheus Spring Packard.

GUN-COTTON.
Professor Charles Edward Munroe.

GUNNERY.
Lieutenant-Commander Lewis Sayre Van Duzer.

GUNPOWDER.
Dr. Marcus Benjamin and Captain John W. Joyes.

GYMNASIA.
Professor Paul Monroe.

GYMNOSPERMS.
Professor John Merle Coulter.

GYPSY MOTH.
Dr. Leland Ossian Howard.

HABEAS CORPUS.
Professor George W. Kirchwey.

HAIRDRESSING.
Mr. Russell Sturgis.

HAITI.
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HARMONY.
Professor Alfred Remy.

HARTMANN.
Professor Evander Bradley McGilvary.

HARVARD UNIVERSITY.
Dr. Robert Arrowsmith.

HAT.
Mr. Moses Nelson Baker.

HAWTHORNE.
Professor William Peterfield Trent.

HAY.
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HEAT.
Professor Joseph Sweetman Ames.

HEATING AND VENTILATION.
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HEAVEN.
Dr. Frank Hugh Foster.

HEBREWS, EPISTLE TO THE.
Professor Melanchthon W. Jacobus.

HEGEL.
Professor Evander Bradley McGilvary.

HEINE.
Dr. Benjamin W. Wells.

HEIR.
Professor George W. Kirchwey.

HELL.
Professor Nathaniel Schmidt.

HEMP.
Dr. Alfred Charles True.

HERALDRY.
Professor Dana C. Munro.

HEREDITY.
Professor Alpheus Spring Packard.

THE NEW INTERNATIONAL ENCYCLOPÆDIA

GOETHITE, gē'tīt (named in honor of Goethe). A hydrated iron peroxide that crystallizes in the orthorhombic system, with an adamantine lustre, and yellow-red to brown in color. It occurs with other iron oxides, especially hematite or limonite, in Nassau, Saxony, and elsewhere in Germany; at various localities in England; and in the United States in the Lake Superior region, Missouri, Colorado, California, and elsewhere. Goethite is sometimes found penetrating quartz-like rutile, forming sagenite or "Venus's hair stone," which, when cut, is used for seals and charms in jewelry.

GOETSCHIUS, gēt'shī-ūs, PERCY (1853—). A distinguished American musical scholar, writer, and composer, born in Paterson, N. J. A graduate of the Stuttgart Conservatory of Music, he was in 1876 placed in charge of the English classes there, and in 1885 was made royal professor. He at the same time contributed to the leading musical journals of Germany. He was called to Syracuse (N. Y.) University in 1890, as professor of harmony, musical history, and advanced pianoforte playing. Soon after he took charge of the composition branch of the New England Conservatory, but in 1896 resigned all institutional appointments. He was appointed organist of the First Parish Church of Brookline in 1897. Besides a number of instrumental pieces and sacred songs and anthems, he is the author of the following important works: *The Material Used in Musical Composition* (1882); *The Theory and Practice of Tone Relations* (1892); *Models of the Principal Musical Forms* (1895); *Syllabus of Musical History* (1895); *The Homophonic Forms of Musical Composition* (1898). He has also made a thorough revision of the complete pianoforte works of Mendelssohn for the Cotta edition (Stuttgart, 1889).

GOETZ, gēts, THEODOR VON (1826-92). A German battle painter, born in Lieschen, Silesia. He studied at first under the genre painter Hantzsch, in Dresden, but turned later to military subjects. He is particularly noteworthy for his faithful representations of the events of the Franco-German War of 1870-71, in which he took part as commander of a battalion of riflemen. His pictures include: "Episode in Battle of Sedan" (1875); "Prince George of Saxony in Battle of Saint-Privat" (1876); and "Crown Prince Albert After the Battle of Beaumont Congratulated by Prince George" (1887, Dresden Gallery).

GOETZ, or GÖTZ, VON BERLICHINGEN, gēts fŏn bĕr'lĭk-ĭng'ĕn. See BERLICHINGEN.

GOEZE, gē'tse, JOHANN AUGUST EPHRAIM (1731-93). A German theologian and naturalist, a brother of Johann Melchior Goeze. He was born at Aschersleben, and studied theology at the University of Halle (1747-51). After occupying several pastorates, he became deacon of the cathedral at Quedlinburg, where he died. He is best known for his researches in natural history. His microscopical investigations led to the publication of the important work entitled *Versuch einer Naturgeschichte der Eingeweidewürmer tierischer Körper* (1782; appendix, 1800). In 1773-74 he prepared about seventy-five translations of Bonnet's treatises on the natural history of insects.

GOEZE, JOHANN MELCHIOR (1717-86). A German Lutheran clergyman, born at Halberstadt (Province of Saxony, Prussia). Educated at Jena and Halle, he became pastor of the Church of the Holy Spirit at Magdeburg in 1750, and, in 1755, chief pastor of Saint Catharine's Church at Hamburg. From 1760 to 1770 he held the seniority of the Lutheran clergy at Hamburg. He is known chiefly as a tireless controversialist, and in particular for his attacks on Lessing because of the latter's publication of the posthumous *Fragmente eines Ungenannten* (1774, 1777, 1778) of the free-thinker, Hermann Reimarus. He began the well-known contest in 1777, with an essay in Nos. 55 and 56 of the *Freiwillige Beiträge zu den Hamburgischen Nachrichten,* which he followed by *Etwas Vorläufiges gegen des Herrn Hofrath Lessings mittelbare und unmittelbare feindselige Angriffe* (1778), and *Lessings Schwächen* (1778), all acrid and personal. Lessing made his chief reply in 1778 in *Eine Duplik, Eine Parabel, Axiomata* and *Anti-Goeze,* among both the keenest of his writings and the foremost examples of the literature of the class. The pastor had little of the incisive thought, and yet less of the skillful expression, of his opponent. He was intolerant, even for the time, and a stickler for a narrowly literalistic interpretation of the Scriptures. His polemics against Lessing were edited by E. Schmidt in 1893. Consult further: Cropp,

Lessings Streit mit Hauptpastor Goeze, in Heft 155 of the *Deutsche Zeit- und Streit-Fragen* (1881). See LESSING.

GOFFE, WILLIAM (?-c.1679). An English regicide, born in Sussex, where his father was the rector of a church at Stammer. Apprenticed to a salter in London, he embraced the cause of the Parliament against Charles I., and in 1645 was commissioned a captain in the New Model army, in which, by his zeal and bravery, he won rapid promotion. He was one of the judges at the trial of Charles I., and signed the death warrant. He commanded Cromwell's old regiment at the battle of Dunbar, and distinguished himself at Worcester. He was elected to Parliament in 1654, and was promoted major-general in 1655, with command in Sussex, Berkshire, and Hampshire. In 1656 he supported the proposition to offer the crown to Cromwell, by whom he was appointed a member of the newly constituted House of Lords. At the Restoration he was excepted from the Act of Indemnity, and escaped with his father-in-law, General Whalley, to America, settling first at Cambridge, and thence, in order to escape arrest, removing to Connecticut, where he lived in retirement in New Haven and various towns in the Connecticut River Valley. In 1664 he removed to Hadley, Mass., where, according to the tradition, he appeared on the occasion of an Indian attack upon the town in 1675, rallied the frightened townsmen, and drove off the raiders. This incident has been used by Scott in his *Peveril of the Peak*, and by Cooper in his *Wept of Wish-ton-Wish, or The Borderers*, and forms the subject of "The Gray Champion" in Hawthorne's *Twice-Told Tales*. Consult Stiles, *History of Three of the Judges of King Charles I.* (Hartford, 1794).

GOG AND MA'GOG. Names occurring several times in the Bible. Gog is mentioned in Ezek. xxxviii. 16-18, and also xxxix. 1 in connection with Meshech and Tubal. Magog appears in Gen. x. 2 and I. Chron. i. 5 as a son of Japheth, and in the Hebrew text of Ezek. xxxix. 6, where the Greek version reads Gog. It has been conjectured that in this passage and in Gen. x. 2 Magog is a scribal error for Gog, or, according to others, Magog in the latter passage is miswritten for Gomer. The association of Gog with Meshech and Tubal, the location of which can be determined from the Assyrian inscriptions, points to some part of Armenia as the district intended by Gog. Various attempts have been made to explain the name. By some Gog has been connected with Gagu, a ruler of a land Sakhi, to the north of Assyria, who is mentioned by Assurbanipal, and who has been regarded by some as identical with Gyges, King of Lydia, although all such conjectures are futile. We must rest content with the fact that in the Old Testament Gog is the name of a northern region. In view of the terror inspired by the approach of the northern hordes, roughly known as the Scythians, who eventually brought about the destruction of the powerful Assyrian Empire (see ASSYRIA), Gog, in association with Magog, became a general designation for a powerful and wicked opponent, and in the later apocalyptic writings becomes one of the terms descriptive of Antichrist (cf. Rev. xx. 8). The uprising of Gog and Magog against the kingdom of Christ and their destruction by God Himself is the precursor of the millennium. In the Koran Gog and Magog represent a barbarous people of Central Asia in the days of Dhu-l-Qarnain (Alexander the Great). They are also represented as appearing in the last days.

Gog and Magog are names popularly given to the two wooden statues of giants preserved in the Guildhall at London. According to the story, the living prototypes of the two figures were the survivors of a race of giants found in Britain by Brute, son of Antenor of Troy, and by him subdued. They were brought prisoners to London, where they were chained to the gates of a palace on the site of the Guildhall and kept as porters. When they died, their effigies were set up in their place. This is Caxton's account; but there is another, which represents one of the giants as Gogmagog, and the other as a British giant who killed him, named Corineus. The two giants have been the pride of London from time immemorial. On London Bridge they welcomed Henry V. in 1415; in 1558 they stood by Temple Bar, when Elizabeth passed through the city gate. The old giants were burned in the great fire, and the new ones were constructed in 1708. They are fourteen feet high, and occupy suitable pedestals in the Guildhall. The ancient effigies, which were made of wickerwork and pasteboard, were carried through the streets in the Lord Mayor's shows, and copies of the present giants were in the show of 1837.

GOGGLE-EYE (so called from its protruding eyes). The rock-bass (*Ambloplites rupestris*), locally so called. See ROCK BASS.

GOGGLE-NOSE (so called from the round, black spots on its nose, which resemble goggles). A local name among American gunners for the surf scoter (duck). See SCOTER.

GOGOL, gō'gôl, NIKOLAI VASSILYEVITCH (1809-52). One of the greatest of Russian writers, born in the Government of Poltava, of a family of Cossack origin. On graduating at the Nyezhin Lyceum he went to Saint Petersburg (1828), and was a clerk in the Department of Appanages in 1830-32. During these years he published a series of sketches, *Evenings at a Farmhouse Near Dikan'ka*. In these he exploited his personal knowledge and his grandfather's stories of Cossack every-day life. It brought him immediate attention and the friendship of Pushkin and Pletnyoff, who obtained for Gogol an instructorship in literature, and in 1834 an adjunct professorship in history. This he soon resigned for purely literary work. During 1832-34 appeared a second series, *Mirgorod* (collected in 1835), containing among others: *Taras Bulba*, *Old World Proprietors*, and *How the Two Ivans Quarreled*. *Taras Bulba*, rewritten and enlarged in 1842, is a glowing picture of the Cossack struggles with the Catholic Poles and Mohammedan Tatars in the sixteenth century. It is an epic in poetic prose. The two other sketches are minute studies of Little Russian life. The series *Arabesques* deals with the life of the small middle class in Saint Petersburg. In 1836 appeared the comedy *Revizor*, which held up to ridicule the ignorance, corruption, trickery, and arbitrariness of provincial officialdom. A mighty cry of treason went up from all who were supported by State money, and but for the will of Nicholas I., who heartily enjoyed it, it would have been immediately withdrawn from the stage. The intense mortification at the general

protest it aroused undermined his constitution, and for twelve years Gogol lived mostly abroad, searching in vain for health. In 1842 he published the first volume of *Dead Souls*, describing the adventures of Tchitchikoff, who travels all over Russia in pursuance of a scheme of becoming an estate-holder by purchasing the dead serfs ('souls' of the dead), who are officially counted as living until the next census. It embraces types of all walks of Russian life, drawn with all his former art and with a mastery still further accentuated. The second volume was almost ready in 1845, but he burned it in a fit of hypochondria, of which he had become a victim, and which made him a religious mystic and champion of autocracy. A rough draft and detached scraps of it found after his death were brought into shape and published by his friends. It clearly reflects his dwindling intellectual powers; the personages are mostly figures of the goody-goody type, drawn not from actual life, but simply as a foil to the characters in the first volume. The *Excerpts from the Correspondence with My Friends* (1847) presented the painful spectacle of recantation and negation of his artistic work, in a manner anticipating Tolstoy's similar utterances. Gogol died in Russia, after a pilgrimage to Jerusalem in 1848. He is generally considered the founder of the Natural School. The best critical edition of his works is that of Tikhuravoff (1889-1900). Consult: V. I. Shenrok, *Materials for Gogol's Biography* (Moscow, 1892-98). English translations: Hapgood, *Saint John's Eve and Other Stories; Taras-Bulba; Tchitchikoff's Journeys, or Dead Souls* (New York, 1886); Sykes, *The Inspector-General, or Revizor* (London, n. d.).

GOG'RA, or **GOG'ARI.** One of the largest affluents of the Ganges (q.v.), British India, joining that river from the left near Dinapur after a generally southeast course of 600 miles (Map: India, D 3). It rises in latitude 30° 28′ N., and longitude 80° 40′ E., on the southern declivity of a Himalayan range. After receiving many tributaries on both sides, it enters the great plain of Hindustan, after a course of 148 miles, and 70 miles lower down becomes navigable for craft of considerable burden. Farther down it is navigable for boats of all sizes at all seasons. The principal affluents are the Sarju and the Rapti.

GOHIER, gō'yā', Louis Jérôme (1746-1830). A French politician, born at Semblançay (Indre-et-Loire). A distinguished advocate, he was Deputy from Ille-et-Vilaine to the Legislative Assembly of 1791. The following year he became Secretary of the Department of Justice and then Minister of Justice (1793), succeeding Garat. He was president of the criminal court, judge of the Court of Cassation, and last president of the Directory (1799). In 1802 Napoleon made him Consul-General to Holland, and wished to send him in the same capacity to the United States (1810), when Gohier retired from public life. His *Mémoires* were published in 1824.

GOIL, goil, Loch. A small sea-loch in Argyllshire, Scotland, a branch of Loch Long, six miles in length, and less than one mile in breadth (Map: Scotland, D 3). Its shores are very steep, wild, and rugged, but diversified by extensive woods of hazel. Lochgoilhead is a favorite summer watering-place.

GOITO, gō'ē-tô. A town in the Province of Mantua, Italy, on the right bank of the Mincio, 11 miles northwest of the city of Mantua (Map: Italy, E 2). Its vicinity to Mantua has made it the scene of numerous battles. Population of commune, in 1901, 5694.

GOITRE (Fr., from Lat. *gutter*, throat). An enlargement of the thyroid gland (q.v.) occupying the front of the neck, and sometimes of such a size as to project downward over the breast and even admit of being thrown over the shoulder. Goitre is, for the most part, an endemic or local disease, being found in the mountainous regions of the Alps, Andes, and Himalayas, in the Pennine Range, and in Derbyshire, England (whence Derbyshire neck), in the Rhone valley, in the Indian Punjab, and in North Italy, especially, it is said, where lime prevails largely as a geological formation. The proofs of goitre being connected with a calcareous impregnation of the drinking-water are strong. Women are oftener affected with goitre than men. An explanation offered for this fact is to the effect that they drink more water than men. Goitre is met with endemically to a slight extent in various parts of Scotland, but on a very small scale indeed as compared with Switzerland, in which it is a very important deformity, especially when connected with cretinism (q.v.). Sporadic goitre may occur in any country. The pathological changes which underlie the enlargement of the thyroid in goitre are not always the same in all cases. In some cases the enlargement is general with the formation of many new follicles, which contain a gelatinous material known as 'colloid.' In other cases there is little new gland formation, the increase in size being due to dilatation of the blood-vessels. In still other cases the gland is the seat of cysts of various sizes. In the form of goitre known as exophthalmic goitre (see Basedow's Disease), which is marked by protrusion of the eyes (*exophthalmos*) and functional disturbance of the heart action, there is increase in the size of the thyroid, which Greenfield describes as a condition of active glandular proliferation. From the symptoms of this disease taken in connection with the known effect of thyroid extract upon the system, it seems probable that the change in the gland is the pathological basis of the disease. The usual treatment of goitre consists in the administration of very minute doses of iodine for a long time internally, locally by inunction, or locally by cataphoresis. (See Electricity, Medical Uses of.) In a few rare cases, the administration of thyroid gland has cured. In others, the administration of thymus gland has cured.

GÖKINGK, gē'kĭnk, Leopold Friedrich Günther von. See Göckingk.

GOKTCHA, gōk'chä, or **SEVANGA** (syĕ-vän'gä) **LAKE.** A lake in the Transcaucasian Government of Erivan, situated at an altitude of about 6300 feet, and surrounded by high mountains (Map: Russia, G 6). It is about 45 miles long, 23 miles wide, and has an estimated area of 540 square miles. It receives a large number of mountain streams. The outlet is through the Sanga, a tributary of the Aras. In the northwestern part of the lake is the island of Sevang, with an old Armenian monastery.

GOLAW, gō'läv, Salomon. The pseudonym of the German epigrammatist Friedrich Logau (q.v.).

GOLCON'DA. A ruined city and fortress in the Nizam's dominions, India, seven miles northwest of his capital, Hyderabad, in latitude 17° 22′ N., and in longitude 78° 25′ E. (Map: India, C 5). The ruins of the ancient city, once the metropolis of the Kingdom of Golconda, the solid mausolea of its former sovereigns, which form a vast group at a distance of 600 yards from and overlooking the fortress, and the fortress itself, are all of great archæological importance and interest. The fort is now used as a State prison and as the Nizam's treasury. Golconda is proverbially famous for its diamonds, which, however, were merely cut and polished here, being generally found near the southern frontier of the Nizam's dominions.

GOLCONDA. A village and the county-seat of Pope County, Ill., on the Ohio River, 107 miles below Evansville, Ind. (Map: Illinois, D 6). It is the shipping point for a farming and mining district, and has flour-mills, lumber-mills, cooperage works, etc. Population, in 1890, 1174; in 1900, 1140.

GOLD (AS., OHG. *gold*, Ger. *Gold*, Goth. *gulþ;* connected with AS. *geolu*, Eng. *yellow*, Lat. *helvus*, grayish yellow, Gk. χλωρός, *chlōros*, yellowish green, Skt. *hari*, yellow). A metallic chemical element, probably the first metal known to man. The alchemists regarded gold as the most perfect metal, compared it to the sun, and designated it by the same symbol by which they represented that orb; their efforts were constantly directed toward the transmutation of baser metals into pure gold. Gold is widely distributed in nature, and is frequently found native, though usually alloyed with silver and containing small quantities of copper or iron; it is also associated with palladium, rhodium, and bismuth. It is sometimes found crystallized, usually as octahedra or tetrahedra, but more commonly in thin laminæ or grains in sand or gravel. Its presence in this condition is believed to have been caused by the disintegration of gold-bearing rocks, and it is readily collected from such alluvial sources by washing the auriferous soil. The purest specimens of native gold have yielded from 99.7 to 99.8 per cent. of the pure metal, the average California gold containing 88 per cent., while Australian gold sometimes runs as high as 96 per cent. pure metal. Gold also occurs in combination with mercury as electrum, with silver and tellurium as sylvanite, and with tellurium and lead as nagyagite. It is further found in various sulphides, as those of copper, lead, iron, and zinc; also in other ores, and in sea-water.

Gold (symbol, Au; atomic weight, 197.2) is of a bright yellow color when pure, and has a high metallic lustre. It is the most malleable of all metals, and has been hammered into a leaf 0.00009 millimeter in thickness. In this condition it appears green by transmitted light. Gold is very ductile, and can be drawn into wire so fine that 166 meters weigh but a single gram. Its specific gravity is 19.31, and it melts at about 1075° C. It is a good conductor of both heat and electricity. Whatever the temperature, neither water nor oxygen is capable of attacking it; and it is not affected by fusion with potassium chlorate. It yields, however, to alkalies and nitrates, and especially to sodium or potassium cyanide. It is not dissolved by any single acid, except selenic, but readily passes into solution when treated with aqua regia (a mixture of nitric and hydrochloric acids), or with other acid liquids in which chlorine or bromine is evolved. Pure gold, being too soft for all ordinary purposes, is generally alloyed with other metals. With copper it yields a reddish alloy, which is quite hard; the standard metal used for coinage is made up of eleven parts of gold and one of copper. With silver it yields so-called 'white alloys,' which are used for jewelry. It combines readily with mercury, forming a white amalgam of a pasty consistency. The most extensive uses of gold are for coinage, for jewelry, for gilding frames, furniture, books, etc., for electroplating, and in dentistry.

Compounds. With oxygen gold forms a monoxide, or *aurous* oxide, and a trioxide, or *auric oxide*. The former is obtained by decomposing aurous chloride with cold dilute potassium hydroxide; the latter by heating a solution of gold trichloride with an excess of magnesia and well washing the precipitate with nitric acid. Auric oxide, which is the more common of the two, combines with bases, forming salts called *aurates*. Perhaps the most important of the compounds of gold with acids is auric chloride, which is readily obtained by dissolving metallic gold in aqua regia and evaporating the solution to crystallization. The resulting orange-red crystals may be further purified by recrystallization. It is a very deliquescent salt, and is chiefly employed for toning silver prints in photography.

Fulminating Gold, which was originally described in a work published under the name of Basil Valentine, is a green or brown powder that readily explodes when dry; it may be obtained by the action of ammonia on gold hydroxide, or by precipitating gold chloride with ammonia or its carbonate.

Gold Purple, or *Purple of Cassius*, which was originally prepared by Andreas Cassius, and described in 1685, is a flocculent purple precipitate obtained by treating a solution of stannous and stannic chlorides with gold chloride. The resulting product is believed to be a mixture of tin oxide and finely divided gold. The color of ruby glass is due to small proportions of this pigment.

Mosaic Gold is a fine flaky yellow variety of tin bisulphide; it is prepared by heating a mixture of seven parts of sulphur, six parts of ammonium chloride, and eighteen parts of a powdered amalgam consisting of two parts of tin to one of mercury. When the odor of hydrogen sulphide is no longer perceptible, the heat is raised to low redness, and the mercurous chloride, ammonium chloride, and mercuric sulphide are volatilized. The mosaic gold thus obtained is used as an imitation bronze in the arts.

Production of Gold. The supply of gold in ancient times was derived mostly from surface deposits of sands and gravels which yielded their values by simple processes of washing. Gold was thus mined at a very early period in India, Central Asia, the southern Urals, and in the region bordering the eastern Mediterranean. With the progress in metallurgical knowledge attention was directed to the exploitation of auriferous veins, a branch of the industry which seems to have attained to some importance before the opening of the Christian Era. Ancient workings of this character, ascribed to the Egyptians, have been found in the mountains of Nubia; and

Dr. Karl Peters has described recently extensive mines in the interior of South Africa, not far from the gold-fields of Rhodesia—a locality believed by Dr. Peters to be the Ophir of the Israelites. The Romans operated mines in Hungary, Spain, and Great Britain at various periods. During the Middle Ages the mining industry seems to have made little progress. It is estimated that the total stock of gold in Europe when America was discovered did not exceed $225,000,000. From this time on, however, there has been a gradual though not uninterrupted increase in production, as may be seen from the following table:

World's Production of Gold Since 1492

Period	Annual average	Total for period
1493-1520	$3,855,000	$107,931,000
1521-1544	4,759,000	114,205,000
1545-1560	5,656,000	90,492,000
1561-1580	4,546,000	90,917,000
1581-1600	4,905,000	98,095,000
1601-1620	5,662,000	113,248,000
1621-1640	5,516,000	110,324,000
1641-1660	5,828,000	116,571,000
1661-1680	6,154,000	123,084,000
1681-1700	7,154,000	143,088,000
1701-1720	8,520,000	170,403,000
1721-1740	12,681,000	253,611,000
1741-1760	16,356,000	327,116,000
1761-1780	13,761,000	275,211,000
1781-1800	11,823,000	236,464,000
1801-1820	9,711,000	194,215,000
1821-1840	11,466,000	229,320,000
1841-1860	84,845,000	1,696,909,000
1861-1880	120,691,000	2,413,829,000
1881-1900	158,140,000	3,162,800,000
Total		$10,067,833,000

These statistics have been compiled by the late Adolf Soetbeer and by the United States Mint from the most authoritative sources. The total output for the entire period of 408 years is equivalent at the coinage value of $20.67 per ounce to 487,031,000 troy ounces, or approximately to 16,200 short tons. The production since 1850 has exceeded that of the preceding three and a half centuries. Along with the discovery of new gold-fields have come improved processes for treating low-grade and rebellious ores, such as the cyanide and chlorination processes, and a more systematic adaptation of mining and metallurgical establishments to the varying natural conditions.

The important gold-producing countries at the present time are the United States, the Transvaal Colony, Australia, Canada, and Russia. In 1898 their combined output was about 87 per cent. of the world's total, and the proportion would now be even larger had not the Boer War given a great check to mining operations in South Africa, bringing about a decrease in the total production of the world from $307,168,800 in 1899 to $255,634,500 in 1900. The distribution of the production in 1900 by countries is shown in the table following, compiled by the United States Mint.

United States. The gold-fields of the United States are widely distributed both geographically and geologically, but, as elsewhere, the occurrence of gold is limited to areas of crustal and volcanic disturbances, these apparently being the prime factors that govern the formation of ore bodies the world over. There are thus two distinct regions in which gold is produced, the eastern region along the Appalachian Mountains, and the western or Cordilleran region. Gold has been found at numerous localities on the eastern slope of the Appalachians, and the mountain system might be said to be gold-bearing

World's Production of Gold in 1900

Country	Troy ounces	Value
North America:		
United States	3,829,897	$79,171,000
Canada	1,348,720	27,880,500
Mexico	435,375	9,000,000
Central America	24,188	500,000
South America:		
Argentina	2,112	43,700
Bolivia	16,075	332,300
Brazil	161,104	3,330,300
Chile	78,735	1,627,600
Colombia	57,804	1,194,900
Ecuador	5,208	107,700
Guiana (British)	98,487	2,035,900
Guiana (Dutch)	27,882	576,400
Guiana (French)	76,468	1,580,700
Peru	52,498	1,085,200
Uruguay	1,492	30,800
Venezuela	28,710	593,500
Europe:		
Austria-Hungary	103,615	2,141,900
Germany	3,192	66,000
Great Britain	13,360	276,200
Italy	1,704	35,200
Portugal	227	4,700
Russia	974,537	20,145,500
Spain	418	8,600
Sweden	2,845	58,800
Turkey	675	14,000
Asia:		
China	269,662	5,574,400
East Indies (British)	27,643	571,400
East Indies (Dutch)	21,041	435,000
India (British)	456,444	9,435,500
Japan	53,421	1,104,300
Korea	217,687	4,500,000
Africa	419,503	8,671,900
Australasia	3,555,506	73,498,900
Total	12,366,235	$255,632,800

throughout its extent from Maine to Alabama, although workable deposits occur only in the southern section. The auriferous belt, varying from a few miles to 75 miles in width, extends from Virginia in a southwesterly direction through North Carolina, South Carolina, and Georgia, into Alabama. Both quartz and surface deposits are worked, but the former are the most important at present. The veins cut through slates and schists, and carry iron and copper pyrites, with which the gold is usually associated. Dahlonega, Ga., and Haile Goldmine, S. C., are the chief mining centres. The Western gold-fields, to which this country owes its prominent place as a producer of gold, are scattered over the whole region between the eastern foothills of the Rocky Mountains and the western slopes of the Sierra Nevada and Cascade Ranges. Only those of special importance will be mentioned here, as a general description of the gold resources of the West may be found under the titles of the different States (qq.v.).

The auriferous belt of California extends through the northern and central parts of the State, and from the summits of the Sierras to the San Joaquin and Sacramento valleys. Its wonderful, almost unparalleled richness has furnished the incentive for the exploration and rapid development of the whole Far West. From the first discovery in 1848 to 1900 the output has

amounted to $1,350,000,000, or about one-eighth of the entire output of the world since 1492. The gold occurs in three types of deposits: River gravels or placers, high gravels, and veins. The river gravels, found in the beds of the numerous streams that flow down the western slopes of the Sierras, have been derived from the higher levels, where the erosive processes have cut deeply into the auriferous rock formations. Most of the gold is generally found near bed-rock, and it is necessary to remove a heavy overburden before the values can be obtained. The gold particles vary from minute pellets or dust to nuggets of considerable size. The high gravels represent the work of ancient rivers whose channels are more or less parallel to those of the present day, but have been filled in with detrital materials and frequently buried beneath lava flows. They lie along the higher slopes of the Sierras up to 5000 feet above sea-level, and sometimes attain a thickness of 500 feet. The veins, which have furnished the gold found in both the placers and high gravels, occupy fissures in slates, schists, and igneous rocks, and are of variable extent and richness. Quartz is generally the gangue material, while the gold occurs in a free state or combined with sulphides, most commonly pyrites. A great series of these veins, called the 'mother lode,' extends across Tuolumne, Calaveras, Amador, and El Dorado counties; for a number of years it has been the source of much of the gold mined in the State. The Comstock Lode (q.v.) is situated on an eastern spur of the Sierras, extending into Nevada. Placers and veins similar to those of the Sierras are found also in Oregon and Washington.

The Rocky Mountains and the outlying ranges, which were first prospected by Californian miners in the early sixties, include an immense area of gold-bearing territory. Rich gravels have been worked near Leadville, Fairplay, and in San Miguel County, Colo.; near Helena and Butte, Mont.; along the Snake River, Idaho; near Deadwood, S. D.; and at Santa Fé, N. M. Leadville was originally settled by gold-miners, but the chief industry for a long time has been the mining of lead-silver ores; it is now coming to the front again as a gold-producer. About 1890 important discoveries of telluride ores were made in the granite hills surrounding Pike's Peak, and since then Cripple Creek has become the centre of the richest gold field in America. In 1900 more than $18,000,000 in gold was taken from these deposits. The Black Hills of Wyoming and South Dakota have a well-developed mining industry which is based largely upon the occurrence of extensive but low-grade ore bodies. Much of the ore is refractory, yielding only a portion of its gold to amalgamation, so that large cyanide plants have been installed here. There are numerous small fields in Montana, Utah, Idaho, Arizona, and New Mexico, which in the aggregate yield considerable amounts of gold annually. See Map with UNITED STATES.

Alaska, the seat of the most recent discoveries, gives promise of great future importance. With the exhaustion of the rich placers and beach deposits, such as were found at Cape Nome and in the interior districts, attention will be directed to quartz mining, which affords a more permanent basis for the industry. It is noteworthy that the Territory was a producer of gold several years before the surface deposits were discovered; the quartz mines on Douglas Island, near Juneau, have yielded a large output from ore that averages only $2 per ton.

CANADA. The rich alluvial deposits of Yukon Territory furnish the larger part of the output, the remainder coming from British Columbia, Ontario, and Nova Scotia. In the Yukon region the gold is concentrated in the recent gravels along the rivers and in the terraces on the sides of the valleys. A few quartz veins have been found, but so far the production from this source is small. See YUKON GOLD-FIELD.

RUSSIA. Most of the gold is derived from placer workings on the eastern slope of the Urals. Little progress has been made in the introduction of improved methods and appliances, and only the richer deposits can be exploited at a profit. There are small quartz mines in the interior districts of Siberia.

TRANSVAAL COLONY. The Witwatersrand goldfield, near Johannesburg, is one of the most remarkable and productive in the whole world. The deposit is a conglomerate, commonly called 'banket,' varying from a few inches to several feet in thickness and averaging about $10 per ton in gold. It can be traced for several miles along the strike, and, as it retains its auriferous tenor with depth, there is an enormous reserve of ore for future working. The output of the Transvaal mines in 1898 was $78,071,000, but it fell to about $7,000,000 in 1900 owing to the war. When operations are again resumed in full force the Transvaal Colony undoubtedly will assume the premier position as a producer. The amount of gold available in the ore for future working runs into billions of dollars.

AUSTRALIA. Gold-mining holds a prominent place among the industries of the Commonwealth. The rich alluvial deposits that first attracted the attention of miners are largely exhausted, but there are still considerable areas of surface gravels which repay working with modern methods. An increasing proportion of the output each year comes from quartz veins. The most productive fields are those of Murchison and Coolgardie in Western Australia; Charters Towers and Mount Morgan in Queensland; and Ballarat, Sandhurst, and Beechworth in Victoria.

GOLD-MINING. Gold-mining operations may be divided into two classes, which are commonly called placer mining and quartz mining. The deposits of gold first mined were called placers, and were the river-bed deposits of gold-bearing sand and gravel. These deposits are known as dry placers when they are ancient river-beds from which the water has gone, and as wet placers when they are the beds of existing streams. The process of dry-placer mining consists in excavating the gold-bearing sand and separating the gold from it by washing, according to one of the methods described in the succeeding section on Metallurgy. Dry-placer workings are divided into surface placers and deep placers. The most important method of placer mining is the hydraulic method, which was first attempted in a crude way in 1852 in Placer County, Cal., and is now practiced on an immense scale. Briefly described, hydraulic mining consists in directing a powerful stream of water from a pipe against the gold-bearing gravel bank, which breaks down the material and washes it away through sluices, where the separation of metal is accomplished as described below. Wet-placer mining from the

GOLD MINING BY HYDRAULIC METHODS

beds of existing streams consists either in diverting the stream and working the dried bed in the open or in dredging the gold-bearing sand and gravel. In the latter case the dredges are generally mounted on flat-bottomed boats, which also carry the necessary appliances for extracting the gold. Gold-dredging is extensively practiced in some of the Western States, particularly along the Snake River in Idaho and the Feather River in California, and also in New Zealand.

Quartz mining, or the mining of gold in veins, is carried on by underground mining operations which do not differ materially from similar operations in mining other ores. (See MINING.) Gold-quartz ores are crushed in stamp mills or other forms of crushing machines, and the metal is extracted by one of the metallurgical processes described in a succeeding section. A view of a modern stamp mill and extraction plant is shown on the accompanying plate. In this mill the ore is first crushed to coarse size in gyrating rock-breakers, and then passes to the storage bins, from which it is fed to the stamps. After fine crushing the ore is passed over concentrating tables, which remove a portion of the values as concentrates. The remaining material, commonly referred to as 'tailings,' passes through settling tanks, and is then changed into amalgamating pans, where a further portion of the values is recovered. For illustrations of stamp mill, see GRINDING AND CRUSHING MACHINERY.

METALLURGY. Gold may be extracted from its ores either by direct washing or by combining it with mercury, lead, silver, or copper, or by bringing it into aqueous solution.

EXTRACTION BY WASHING. Extraction of gold by washing alone is possible only in the case of ores carrying native gold. The process is not extensively used in civilized countries, on account of the heavy losses of gold entailed by it, which may amount to 50 per cent. In combination with amalgamation, it is, however, the method most commonly employed. Simple washing is performed by means of pans, cradles, long toms, and sluices, the last being the appliance most used in the United States. The operation called panning is the simplest of all methods of gold-washing and the most wasteful. Prospectors make use of it, however, in testing for gold, and it is still carried on to some extent as a commercial process. In panning, the dish, filled to about two-thirds of its capacity with the pay dirt, is placed under water until the lumps can readily be broken up. The operator then grasps the dish with both hands, raises it to nearly the level of the water, and gives it a gentle oscillatory motion. The mud and fine sand are washed over the far edge, which is gradually lowered until little but coarse pebbles, heavy minerals, and gold remain. After removing the pebbles, the pan is lifted and shaken so as to spread out the materials, when the yellow specks or colors of gold are visible. The cradle is a box provided with a sieve in the upper part, the whole resting on rockers so that it can be rocked by means of a handle. The gold-bearing gravel is placed in the sieve and washed with water, the coarse particles remaining in the sieve and the fine with the gold passing through and falling on the inclined bottom, where the light material runs off with the water, the heavier gold sinking to the bottom, where it is retained by transverse slats known as riffles. The long tom consists of two troughs, of which the lower one has cross-riffles on its inclined bottom. Roughly, the upper trough is about 14 feet long, 20 inches wide at the upper end, and 30 inches wide at the lower end, which is closed by a sieve. The lower end of the upper trough discharges into the upper end of the lower trough, which is about 12 feet long and 3 feet wide. By means of a strong stream of water flowing in at the upper end of the upper trough, the material is carried through both troughs, the gold being caught in the riffles of the lower box. Sluices consist of a series of 12-foot troughs emptying into one another, and often forming a line of troughing several hundred feet long. The bottoms of the troughs have riffles, and at intervals the bottom of the box is replaced by a grating known as a grizzly. Underneath the grating there is a broad trough running at right angles to the main trough and opening into another trough parallel to the main direction and which forms the continuation of the sluice. The coarse gravel is caught by the gratings, and the gold is deposited in the riffles as previously described. Frequently mercury is sprinkled into the riffles, thus combining amalgamation with washing. The sluice is considered the best device for washing gold-bearing gravels. Among the other apparatus for washing gold are puddling tubs or boxes and pugmills. Where water is scarce separation is performed by winnowing or dry blowing. In America the separation of gold by washing is practiced chiefly by prospectors and individual placer miners.

EXTRACTION IN THE DRY WAY. Extraction of gold by alloying it with lead and cupeling is known as the dry process. It may be effected either by introducing ores into a bath of lead, or by smelting the ores with lead-bearing fluxes, or by first smelting the ores for a concentrated product, and then smelting the latter with lead fluxes. The process is practiced chiefly in Hungary and the Harz Mountains. With auriferous copper ores, such as chalcopyrite, bornite, etc., the usual methods of copper-smelting are carried out, as the gold is retained by this metal throughout the different operations in the same way as with lead-smelting. In the Western United States gold ores too poor to pay for separate treatment are frequently sold to copper-smelters at a profit, owing to their added value for fluxing purposes.

AMALGAMATION. The process of extraction by amalgamation consists in combining the gold with mercury, and in decomposing the gold, mercury alloy, or amalgam by heating it, by which the gold is obtained in metal, while the mercury is volatilized and again condensed for further use. Amalgamation without previous crushing of the gold-bearing material is practiced with auriferous sands and gravels, it being extensively used in California in connection with hydraulic mining. The gold-bearing gravel is washed through sluices of the form already described into which mercury has been placed, and where it is retained by the riffles. The amalgamation of artificially crushed materials is a more elaborate process, and is practiced with many variations. In most cases, however, the gold-bearing ore is crushed in stamp-mills. A portion of the gold is caught by the mercury in the stamp-boxes, and the remainder washed out with the sand is caused to flow over copper plates coated with mercury which hold the gold and allow the barren rock or

tailings to float away. At intervals the amalgam on the boxes and on the plates is removed and is placed in retorts to which heat is applied, vaporizing the mercury and leaving the gold as metal.

Extraction by Aqueous Solution. There are two principal methods of extracting gold by means of aqueous solutions, known as the Plattner or chlorination process and the MacArthur-Forrest or cyanide process. The chlorine process consists first in calcining the ore in furnaces, by which all the metals present except gold and silver are converted into oxides, which are not acted upon by chlorine. The next process is the application of chlorine gas to the calcined ores in chlorination vessels. The result is the formation of auric chloride or chloride of gold, which is leached out of the ore by means of water. To this aqueous solution of auric chloride sulphate of iron or charcoal is added, which precipitates the gold. This precipitate is finally treated to remove impurities. In the cyanide process the crushed ore is treated with a solution of potassic cyanide, the addition of zinc to which will precipitate the gold. The process has been most successfully practiced in the Transvaal in treating the tailings from the amalgamation process.

Parting. As the greater part of the gold produced by the preceding processes carries silver (see Silver), the parting of the gold from the silver is an important process in the metallurgy of gold. Parting is performed in what are known as the dry way and the wet way, and by electrolysis. The dry method of parting depends upon the fact that silver can be converted into sulphide or chloride, while gold is attacked by neither sulphur nor chlorine at high temperature. The wet method depends upon the solubility of silver and the insolubility of gold in nitric acid, and in boiling concentrated sulphuric acid. The electrolytic method depends upon the property of silver to pass from a bar of gold-silver alloy employed as an anode to the cathode when the two poles are immersed in an acidulated solution of nitrate of silver, and an electric current established. The wet process, using sulphuric acid as the solvent, and the electrolytic process are the two parting processes most employed at present. For a full treatment of the metallurgy of gold, consult: Schnabel, *Handbook of Metallurgy*, translated (New York, 1889); Egleston, *The Metallurgy of Silver, Gold, and Mercury in the United States* (New York, 1887).

Commercial Uses. It is estimated by competent authorities that about one-fourth of the annual production of gold is employed in coinage, the remainder being consumed in the arts and in making good the annual loss from various causes. The purposes for which gold is employed in the arts are familiar to every one. Some of the items are jewelry plate, gold leaf, gilding, etc.

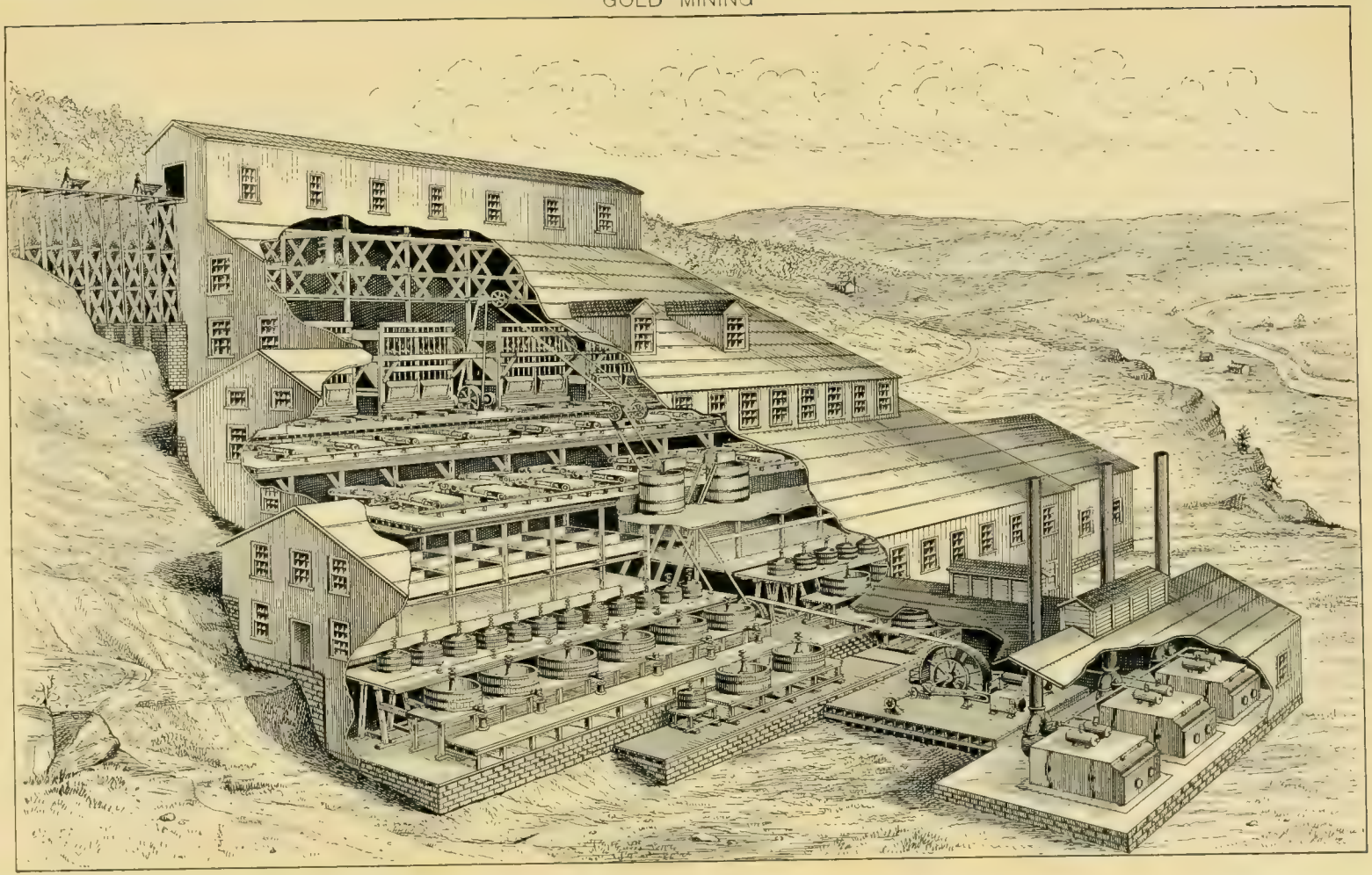
Bibliography. Suess, *Die Zukunft des Goldes* (Vienna, 1877); Delmar, *History of the Precious Metals* (London, 1880); Lock, *Gold, Its Occurrence and Extraction* (London, 1882); Patterson, *New Golden Age, and Influence of the Precious Metals on the World* (London, 1882); Soetbeer, *Materialien zur Erläuterung und Beurteilung der wirtschaftlichen Edelmetallverhältnisse* (Berlin, 1886); Weil, *L'or (chimie, géologie, minéralogie, métallurgie)* (Paris, 1895); Hatch, *The Gold Mines of the Rand* (London, 1895); Rose, *Metallurgy of Gold* (London, 1896); Eissler, *Metallurgy of Gold* (London, 1896); Kemp, *Ore Deposits of the United States* (New York, 1900); *The Mineral Industry* (New York, 1893 et seq.). Statistics may be found in the Annual Reports of the Director of the Mint (Washington, 1880 et seq.).

GOLDAU, gôl'dou. A village in the Canton of Schwyz, Switzerland (Map: Switzerland, C 1). It was formerly situated between Mount Rigi and the Rossberg, and was the scene of the terrible landslide from the Rossberg, September 2, 1806, which destroyed Goldau and three other villages, burying 457 people, and filling up part of Lauwerz Lake. The present village of Goldau, built near the mines, contained a population of about 500 in 1900.

GOLD-BEATER'S SKIN. A delicate membrane prepared from the large intestine of the ox, and used as the fabric for court-plaster, etc., but chiefly by gold-beaters. The outer or peritoneal membrane is used for this purpose. The intestine is first subjected to a partial putrefaction, by which the adhesion of the membranes is sufficiently diminished to enable them to be separated; the separated membrane is then further cleaned from adhering muscular fibres, dried, beaten, and pressed between paper, besides being treated with alum, isinglass, and white of egg, the object of which is to obtain the pure continuous membrane free from grease and impurities, and thus prevent weakening by putrefactive processes. When thus prepared, gold-beater's skin may be beaten continuously for several months with a twelve-pound hammer without material injury. The intestines of 500 oxen are required to furnish the 900 leaves that form one packet, or *mold*, as it is technically called. The manufacture is extremely offensive. Chlorine has been introduced both as a disinfectant and to assist in the separation of the membrane.

GOLD-BEATING. The process by which gold is hammered into thin leaves. The use of gold leaf for gilding is a very ancient art, having been practiced by the Egyptians and Greeks many centuries before the Christian Era, and gold used for this purpose is usually alloyed with silver or copper, according to the color required. The consumption of gold leaf by dentists is also general, as the material in this form is extensively used for fillings. As gold leaf is not sold by weight, but by superficial measure, and as increasing the quantity of alloy diminishes the malleability, there is but little temptation to use the baser metals as an adulteration. The gold is first cast into oblong ingots about three-fourths of an inch wide, and weighing two ounces. The ingot is flattened out into a ribbon of about $\frac{1}{800}$ of an inch in thickness by passing it between polished steel rollers. This is annealed or softened by heat, and then cut into pieces one inch square; 150 of these are placed between leaves of vellum or tough paper, each piece of gold in the centre of a square leaf, another placed above, and so on till the pile of 150 is formed. This pile, called a cutch, is inclosed in a double parchment case, placed upon a marble block, and beaten with a 16-pound hammer. The elasticity of the packet considerably lightens the labor of beating, by causing the hammer to rebound with each blow.

The beating is continued until the inch pieces are spread out to four-inch squares; they are then taken out and cut into four pieces. The



A COMBINATION STAMP MILL AND EXTRACTION PLANT

squares thus produced are now placed between gold-beater's skin instead of vellum, made into piles, and inclosed in a parchment case, and beaten as before, but with a light hammer. Another quartering and beating produces 2400 leaves, having an area of about 190 times that of the ribbon, or a thickness of about $\frac{1}{300000}$ of an inch. An ounce of gold is thus extended to a surface of about 100 square feet. A still greater degree of thinness may be obtained, but not profitably. A thinness has been attained of 367,500 leaves to the square inch, and a grain of gold is thus made to cover 52 square inches. After the last beating, the leaves are taken up with wooden pincers, placed on a cushion, blown out flat, and their ragged edges cut away, by which they are reduced to squares of three and one-quarter inches. Twenty-five of these are placed between the leaves of a paper-book, previously rubbed with red chalk to prevent adhesion of the gold, and are sold in this form. Attempts have been made to apply machinery to gold-beating, but its application is very limited; and most of the gold leaf is still beaten by hand.

GOLD BUG, The. One of the most noted of Poe's tales (1843). The scene is the vicinity of Charleston, where a recluse, Legrand, locates an enormous treasure in gold and jewels by means of an intricate cipher found on an old parchment. The gold bug (a real insect) is a mere incident, used to mystify a companion.

GOLD CARP. See Goldfish.

GOLD COAST. A British Crown colony in West Africa, extending along the Gulf of Guinea about 350 miles, and bounded by the French Military Territories on the north (about the parallel of 14° north latitude), the German Togoland on the east, and the French Ivory Coast on the west (Map: Africa, D 4). The area of the colony excluding Adansi and Ashanti (q.v.) is estimated at 40,000 square miles; the total area, about 72,500 square miles. The coast region is rather low, with rocky cliffs lining the shores, and reaching a height of 2000 feet. The interior is mountainous. In the southeast is the Akuapem range. The northern part of the Ashanti district is low. South of it runs the Adanse range, covered with dense forests, and constituting a great natural barrier along the coast district. The western part of the interior is generally hilly; the eastern part is formed mainly of extensive terraces. The chief rivers flowing south are the Volta, which is a part of the German boundary line, the navigable Ankobra, emptying into the sea near Axim, the navigable Pra, and the Toji. The climate of the colony, although not as deadly as that of the west coast, is very unhealthful for Europeans. April is the hottest month. There are two rainy seasons—from April to August, and from October to the end of December. The rainfall is light on the coast. Impassable forests of palms, gum-trees, and the giant karkum seriously interfere with the development of the interior. The level regions in the south, and the savannas north of the Akuapem Mountains, are overrun with herds of elephants, buffaloes, and other wild animals.

The soil is of great fertility, producing coffee, cacao, tobacco, cotton, and other tropical products. Agriculture has received little attention. The chief products are derived from the forests and mines. The trade of the colony is prosperous and increasing. The principal exports are rubber, valuable woods, palm oil and kernels, gold-dust, and kola-nuts. In 1900 the total trade amounted to $10,590,000, of which $4,309,000 represented exports. The gold deposits are believed to be very extensive and are found mostly in the Province of Wasaw. The export of gold-dust from the colony amounted to $244,800 in 1899 and $185,000 in 1900. In the latter year ships with 1,414,764 tons visited the ports. The Government railway extends from Sekondi on the coast to Kumassi. The colony is administered by a Governor, and by an executive and legislative council, the members of which are chosen from officials and colonial merchants. The revenue of the colony is insufficient to meet the expenditures, and there is an annual subsidy from the mother country. In 1900 the revenue amounted to $1,623,000, the expenditures to $2,511,200, and the subsidy to $1,228,700, the large amount of the subsidy being due to the operations in the territories north of Ashanti. The constabulary numbered 1500 men in 1900. There are sixteen provinces, the most important of which are: Akim; Akkra; Elmina; Ahanta; Dixcove, embracing Axim with its fine harbor; Wasaw, the mineral region; Fanti, including Cape Coast Castle; the mountain region of Akuapem; Brong, on the Volta, with its trade in wood; Awuna, with the fortress Quitta. The population is estimated at nearly 1,500,000, and is composed mainly of two negro tribes, the Akkra and the Tshi. The former live in the Volta region, and are serviceable as sailors and interpreters. The Tshi, a superior people, comprise different tribes—the Ashanti, Wasaw, Denkira, Fanti, etc. There are about four hundred Europeans in the colony. The Government schools number seven, and there are nearly a hundred and fifty religious schools and missions. The chief towns are the capital, Akkra (q.v.), Elmina, and Cape Coast Castle.

The Gold Coast was discovered by the Portuguese in 1470. In 1481 a Portuguese colony of about 700 men under Diogo d'Asambuja landed at the present seaport of Elmina, and erected the fort of Saint George. The Dutch by 1637 had succeeded in driving away the Portuguese. Meanwhile the English began to arrive, but their first attempts at establishing themselves were frustrated by the Dutch. After the establishment of the Royal African Company in 1672, the English succeeded in erecting a number of forts on the coast, and soon concluded an alliance with the Fanti, whose old enemies, the Ashanti, had allied themselves with the Dutch. In 1821 the English possessions on the Gold Coast were taken out of the hands of the Royal African Company, and made a dependency of Sierra Leone. The Fanti, with the aid of the British, decisively defeated the Ashanti in 1826, and in 1831 the rule of England was recognized over the territory lying south of the Upper Pra. In 1872 the Dutch ceded their holdings to the British for trading privileges, and since then the rule of the English has been supreme in the Gold Coast. In 1874 the territory was made a Crown colony. For a further account, see Ashanti. Consult: Macdonald, *The Gold Coast, Past and Present* (London, 1898); Reindorf, *History of the Gold Coast and Ashanti* (Basel, 1895).

GOLDCREST (so called from the yellow spot on its head), GOLDEN-CRESTED WREN, or FIRECREST. English names for European species of kinglets. See KINGLET.

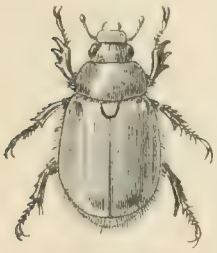
GOL'DEN. A city and the county-seat of Jefferson County, Colo., 16 miles west of Denver; on Clear Creek, and on the Union Pacific, Denver and Gulf, and the Denver, Lakewood and Golden railroads (Map: Colorado, E 2). It is the seat of the State School of Mines, opened in 1874, and of the State Industrial School. There are extensive deposits of coal and clay in the vicinity, and the city has smelting-works, and manufactures of pressed and fire brick, tile, pottery, flour, and beer. Population, in 1890, 2383; in 1900, 2152.

GOLDEN AGE. The earliest of the four ages; the ideal period when the earth, under Saturn's reign, produced fruits without cultivation, when there was no warfare, and man lived in perfect happiness before sin entered in. The characteristics of the Golden Age, and of the ages of silver, brass, and iron which followed, are described in the first part of Ovid's *Metamorphosis*. The term is used to represent the period of highest development in literature, art, and history.

GOLDEN APPLE. See PARIS.

GOLDEN ASS (Lat. *Asinus Aureus*). A fable or romance written by Apuleius, a Latin writer of the second century. The work is entitled *The Metamorphoses, or the Golden Ass*, and was modeled after a similar work by Lucian, which Apuleius paraphrased and embellished with other tales, among which the one best known is that of Cupid and Psyche. The hero is punished for his curiosity by being changed into an ass, and after a series of most wonderful adventures he finally becomes purified and resumes his natural form. This story is thought by some to have been written as a satire on priests, magicians, and debauchees. It has been translated into many of the modern languages. See APULEIUS.

GOLDEN BEETLE. The golden beetles (family Chrysomelidæ, tribe Cassidini) are among the most beautifully colored of all beetles. They are usually small, with a gold or greenish iridescence which fades completely as soon as the insect dies, so that museum collections give no conception of the beauty of these beetles when alive and on their food plant; but the brilliancy is said to vary with the excitation of the beetle. They are flattened below and convex above, hence they have also been named tortoise beetles. The margins of the prothorax and elytra are expanded so as to form an oval flat frame about the convex part of the beetle. Both the adults and the larvæ of *Cassida aurichalcea* feed on the morning-glory and sweet potato, and a large yellow and black species feeds on the sunflower. The caudal end of the larva is forked, and to it are retained the molted skins and frass, which are held up over the body like a shield. Pupation takes place on the under side of the leaves of the food plant.



GOLDEN BEETLE.

GOLDEN BIBLE. A name given on its pretended discovery to the Book of Mormon, which was described as being written on sheets of metal resembling gold.

GOLDEN BOOK. See LIBRO D'ORO.

GOLDEN BULL (Lat. *bulla aurea*, so called from the gold case in which the seal attached to the bull was inclosed). The Imperial edict issued by the Emperor Charles IV., in 1356, for the purpose of settling the form of the Imperial election and coronation, the persons to whom the right of election belonged, and their duties and privileges. Up to that time some uncertainty had prevailed as to the rights of the electoral body, claims having frequently been made by several members of the lay electoral families, and divisions having repeatedly arisen from this uncertainty; the effect of such divisions being to throw the decision for the most part into the hands of the Pope. In order to obviate these inconveniences, the Golden Bull defines that one member only of each electoral house shall have a vote—viz., the representative of that house in right of primogeniture, and in case of his being a minor, the eldest of his uncles paternal. The seven electors were declared to be the Archbishops of Mainz, Trèves, and Cologne, the King of Bohemia, the Count Palatine of the Rhine, the Duke of Saxony, and the Margrave of Brandenburg. The place of election of the Emperor was fixed at Frankfort; the coronation was to take place at Aix-la-Chapelle. On the great question as to the dependence of the Imperial office on the Pope, and as to the right of the Pope to examine and approve the Imperial election, the Golden Bull is silent, although it declares the Emperor competent to exercise jurisdiction in Germany from the moment of election. It invests the vicariate, together with the government of the Empire during an interregnum, in the Elector Palatine and the Elector of Saxony; but it is to be noted that this applies only to Germany. Of the vicariate of Italy, which was claimed by the Popes, nothing is said. The Golden Bull also contains some provisions restraining the so-called *Faustrecht* (literally, 'fist law' or right of private redress). It was solemnly enacted in two successive Diets at Nuremberg and Metz, in the year 1356, and original copies of it were furnished to each of the electors and to the city of Frankfort. The electoral constitution, as settled by this bull, save for the number of electors, was maintained almost unaltered till the extinction of the Empire. There is a translation into English of the Golden Bull in Henderson, *Historical Documents of the Middle Ages* (London, 1892). In Hungarian history there is a constitutional edict called by the same name. It was issued by Andrew II., in 1222. It strengthened the monarchy, although limiting its functions. It contained guarantees of individual liberty, and insured periodical meetings of the assemblies. It preserved the power of the nobles by preventing further subdivisions of fiefs.

GOLDEN CALF. The molten image fashioned, according to biblical tradition, at Sinai by Aaron at the request of the Israelites (Exod. xxxii.). The narrative points to the existence of the bull cult among the Hebrews, for which there is abundant evidence. Images of bulls overlaid with gold stood in the ancient sanctuaries at Dan and Bethel, though this cult is not

traced further back than the days of Jeroboam (I. Kings xii. 28 sqq.; II. Kings x. 29). In Samaria likewise the bull cult was introduced (Hosea viii. 5). There is no reference to any such images in the sanctuaries of the south, and the cult appears to have been confined to the north, and to have been introduced through foreign influences, probably Canaanitish, since among the Canaanites the bull was the symbol of Baal, and the cow the symbol of Astarte. The story of Aaron's making a golden calf may have been originally told to establish the antiquity of the bull cult and its legitimacy as a part of the Yahweh cult; but in the hands of redactors, who as Yahweh purists were opposed to all image-worship, the story was reshaped so as to make it appear that Aaron in reality committed a grievous sin for which atonement had to be made.

GOLDEN CHAIN. See LABURNUM.

GOLDEN CIRCLE, KNIGHTS OF. See KNIGHTS OF THE GOLDEN CIRCLE.

GOLDEN-CROWNED SPARROW. A large and sprightly sparrow (*Zonotrichia coronata*) of Northwestern America, distinguished by a broad stripe of yellow on the crown of the head. It is related to the familiar white-throated and white-crowned sparrows of the Eastern States, and like them has a most pleasing song. It breeds along the coast from northern California to Alaska, nesting on the ground, and is widely migratory.

GOLDEN-CROWNED THRUSH (so called from the yellow spot on its head), or WAGTAIL. An American wood-warbler (*Seiurus auricapillus*). See OVEN-BIRD.

GOLDEN-CROWNED WREN. See KINGLET.

GOLDEN EAGLE. See EAGLE.

GOLDENEYE. A duck of the genus Glaucionetta, having the bill shorter than the head and the nostrils well forward; a garrot. The typical species (*Glaucionetta clangula*) is a common winter visitant, appearing in small flocks, most frequently in severe weather, not only in estuaries, but on the lakes and rivers of inland parts of North America, as it does on those of all the central and southern parts of Europe, and equally on those of the temperate parts of Asia. The wings are pointed and rather short, with the first quill the longest, and the tail of sixteen feathers is rounded and of medium length. In the male the coloration is pied black and white, while it is brown and white in the female. The goldeneye takes its name from the golden-yellow hue of the iris, and the male may be recognized by the metallic green of the head and upper neck, the white patch at the base of the beak below the eye, and by the scapular region being striped with white. The length of the European bird is about 18 inches; the American form (a variety, *Americana*) is somewhat larger. A second North American species is Barrow's, or the Rocky Mountain goldeneye (*Glaucionetta Islandica*), which is larger, and has the white loral spot more extended; it is more northerly and less numerous than the other. Though classed among the sea-ducks, and like them subsisting largely on animal food, these ducks are scattered inland all over the continent, and are well known to gunners by sound as well as by sight, for their wings make a loud and characteristic whistling in flight; hence a common local name is 'whistler' or 'whistlewing.' They go in small parties, mix with other ducks, especially bluebills, and are extremely watchful, often alarming their companions and leading the whole flock swiftly away before any other kind has suspected danger. They breed from Quebec and Dakota northward, and throughout northern regions generally as far as trees go, making their nests of straw, feathers, etc., in cavities of dead trees and tall stumps, and laying eight to ten ashy-green eggs. Consult: Dresser, *Birds of Europe* (London, 1881); Job, *Among the Waterfowl* (New York, 1902).

GOLDEN-EYED FLY. A lace-winged fly of the family Chrysopidæ, so called because in some lights the eye seems made of burnished gold. See LACEWING.

GOLDEN FLEECE. In Greek tradition, the fleece of the ram Chrysomallus, the recovery of which was the object of the Argonautic expedition. (See ARGONAUTS.) The golden fleece has given its name to a celebrated Order of knighthood in Austria and Spain, founded by Philip the Good, Duke of Burgundy, and sovereign of the Netherlands, at Bruges, on January 10, 1430, on the occasion of his marriage with Isabella, daughter of King John I. of Portugal. This Order was instituted for the protection of the Church, and the fleece was probably assumed for its emblem as much from being the material of the staple manufacture of the Low Countries as from its connection with heroic times. The founder made himself grand master of the Order, a dignity appointed to descend to his successors, and the number of knights was at first limited to twenty-four, but was subsequently increased. After the death of Charles V. the Burgundo-Spanish line of the House of Hapsburg remained in possession of the Order; but at the close of the War of the Spanish Succession the Emperor Charles VI. laid claim to it in virtue of his possession of the Belgian Netherlands, and, taking with him the archives of the Order, celebrated its inauguration with great magnificence at Vienna in 1713. Philip V. of Spain contested the claim of Charles, and the dispute, several times renewed, was at last tacitly adjusted by the introduction of the Order in both countries. In Austria the Emperor may now create any number of knights from the old nobility; if Protestants, the Pope's consent is required. In Spain, princes, grandees, and personages of peculiar merit are alone eligible. The insignia are a golden fleece hanging from a gold and blue enameled flintstone emitting flames, and borne in its turn by a steel forming the letter B. On the enameled obverse is the legend *Pretium Laborum Non Vile* ('No mean recompense for effort'). The decoration was originally suspended from a chain of alternate firestones and rays, for which Charles V. allowed a red ribbon to be substituted, and the chain is now worn only by the grand master. The Spanish decoration differs slightly, except when worn on the highest occasions, from the Austrian. The costume consists of a robe of deep-red velvet, lined with white taffeta, and a long mantle of purple velvet lined with white satin and richly trimmed with embroidery, containing firestones and steels emitting flames and sparks. On the hem, which is of white satin, is embroidered in gold *Je l'ay*

empris ('I have dared it'). There is also a cap of purple velvet embroidered in gold, with a hood; the shoes and stockings are red. See ORDERS.

GOLDEN GATE, THE. See SAN FRANCISCO BAY.

GOLDEN HORDE. The name (1) of a great body of Tatars who, under Batu Khan, grandson of Genghis Khan, overran Eastern Europe; and (2) of the khanate or empire which they established on the banks of the Volga, and which is also known as Kiptchak (q.v.). The army led by Batu (known also as Sain Khan, 'the good prince,' and described by Marco Polo as 'a very puissant king') was one of three sent out in 1235 by Ogdai Khan, the successor of Genghis. Crossing the Ural River in 1237, they invaded Russia, penetrating to the very centre of the country, pillaging, burning, devastating, and murdering, defeating army after army, and showing no mercy. Moscow and Kiev and other cities were taken and burned, and their inhabitants put to the sword. From Russia they passed into Poland, Silesia, and Hungary, carrying devastation and bloodshed everywhere. Lublin and Cracow were destroyed in 1240, Breslau was burned in 1241, and at Liegnitz, on the field since known as the Wahlstatt, an army of Silesians, Poles, and Teutonic knights, under Henry II., Duke of Silesia, was overcome, although with great loss to the victors, April 9, 1241. Unsuccessful in the siege of Neustadt, the Horde turned eastward, and Batu pitched his gorgeously embroidered silk tent on the banks of the Volga, and summoned the Russian princes to his presence to do him homage. The empire established by him over the Russians was maintained until the power of the khans was broken by Ivan III. toward the close of the fifteenth century. See KIPTCHAK; and MONGOL DYNASTIES.

GOLDEN HORN. See CONSTANTINOPLE.

GOLDEN HOUSE OF NERO (Lat. *Aurea Domus*). A remarkable structure planned by Nero after the fire of A.D. 64, between the Palatine and Esquiline hills, covering an area of a square mile. It embraced farms, vineyards, game preserves, sulphur and sea baths, ponds and waterfalls, and elaborate colonnades and halls, adorned with the most lavish expenditure. Among its celebrated features were a vestibule containing a colossal bronze statue of Nero, 120 feet in height; a portico 3000 feet long; and a banquet hall with a revolving ceiling of carved ivory representing the firmament. In other halls the ceilings dropped flowers and perfumes on the guests. The walls were incrusted with rare marbles, mosaics, mother-of-pearl, precious stones, and paintings, and the courts and apartments contained hundreds of rare columns and statues. The depression where the Coliseum stands was occupied by a lake. The Golden House had been pulled down before A.D. 75, and its remains were used as foundations for later buildings, particularly for the baths of Trajan and Titus, while the grounds were given back to public use.

GOLDEN HUMMER. A Peruvian hummingbird (*Heliothrix auritus*), having a golden gloss upon its plumage. See Colored Plate of HUMMING-BIRDS.

GOLDEN LEGEND (Lat. *Legenda Aurea*). A celebrated collection of hagiology, which for a time enjoyed almost unexampled popularity, having passed through more than 100 editions, and translations into almost all the European languages. It is the work of James of Viraggio, better known as Jacobus de Voragine, who was born at Viraggio (now Varazze), on the coast, near Genoa, about the year 1230. He entered the Dominican Order (1244), and was provincial of the Order in Lombardy from 1267 to 1286. In 1292 he became Archbishop of Genoa, and by his ability, moderation, and exemplary life he played a most influential part in the public affairs of his time. He died in Genoa in 1298. The *Legenda* consists of 177 sections, each of which is devoted to a particular saint or festival, selected according to the order of the calendar. It presents nearly the entire narrative portions of the Bible, with many homilies and much information, some curious, concerning Church characters. In its execution the work, as may be supposed from its age, is far from critical; but it is deserving of study as a literary monument of the period, and as illustrating the religious habits and views of the Christians at that time. The *Legenda* is also called *Historia Longobardica*, because it appends a brief Lombard chronicle to the life of Pope Pelagius. A translation of the *Golden Legend* was made by William Caxton for the Earl of Arundel, and first published in London (1483); it was reprinted, edited, and modernized by Ellis (London, 1900). The classical edition of the original Latin is by Graesse (Breslau, 1890).

GOLDEN LEGEND, THE. A religious dramatic poem by Longfellow, published in 1851. With *New England Tragedies* and *The Divine Tragedy*, it forms a trilogy entitled *Christus*. It is a mediæval tale, faintly resembling *Faust*.

GOLDEN (or **CAPE**) **MOLE.** A member of a family of insectivores, Chrysochloridæ, confined to South Africa, having an external resemblance to, and the habits of, moles, but in structure more closely allied to the tenrecs and potamogales. They do not dig, as do the true moles, with fore feet modified into hands, but mainly with the enormous claws of the two middle fingers. They take their name from the brilliant and varying bronzed lustre of their fur.

GOLDEN NUMBER (Lat. *numerus aureus*). The number of any year in the Metonic cycle (q.v.). As this cycle embraces nineteen years, the golden numbers range from 1 to 19. The cycle of Meton came into general use soon after its discovery, and the number of each year in the Metonic cycle was ordered to be engraved in letters of gold on pillars of marble. Since the introduction of the Gregorian calendar, the point from which the golden numbers are reckoned is B.C. 1, as in that year the new moon fell on January 1st; and as by Meton's law the new moon falls on the same day (January 1st) every nineteenth year from that time, we obtain the following rule for finding the golden number for any particular year: "*Add one to the number of years, and divide by nineteen; the quotient gives the number of cycles, and the remainder gives the golden number for that year; and if there be no remainder, then nineteen is the golden number, and that year is the last of the cycle.*" The golden number is used for determining the Epact (q.v.), and the time for holding Easter (q.v.).

GOLDENROD ETC.

1. ROUGH-LEAVED GOLDENROD (Solidago patula).
2. "EVERLASTING" (Anaphalis margaritacea).
3. BUSHY GOLDENROD (Solidago lanceolata).
4. WHITE SNAKEROOT (Eupatorium ageratifolium).
5. BLUE-STEMMED GOLDENROD (Solidago cæsia).

GOLDEN ORIOLE. Yellow being the characteristic color of orioles (as implied in the name), the adjective 'golden' has been locally applied to many forms—as, for example, to the American hangnests. Strictly, it belongs only to the European true oriole (*Oriolus oriolus*). See ORIOLE.

GOLDEN PLOVER. See PLOVER.

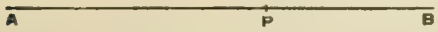
GOLDENROD (*Solidago*). A genus of plants of the order Compositæ. It is closely allied to Aster, but distinguished by the single-rowed pappus, and tapering, not compressed, fruit. The species are natives chiefly of temperate climates, and are most numerous in North America. A few are European; only one is British, the common goldenrod (*Solidago Virgaurea*), a perennial plant of very variable size. At least 75 species are found in the United States, and because of its abundance, wide distribution, and showiness, many botanists and flower-lovers claim for the goldenrod the distinction of being called the national flower. *Solidago bicolor* has cream-colored or nearly white flowers. *Solidago odora* (sweet goldenrod) yields an anisate odor when its leaves, which have even been used as a substitute for tea, are crushed. It contains a volatile oil which has been used in medicine as an aromatic, diaphoretic, and tonic. Blue-stemmed goldenrod (*Solidago cæsia*), and the varieties of *Solidago Virgaurea*, *minuta*, *nemoralis*, and *humilis*, are among the most interesting. Sheep readily eat various species of goldenrod, and as a forage it is considered valuable in parts of New York and elsewhere. Other animals will not eat it to any extent. When prepared in the same manner as hemp, the stalks of *Solidago Canadensis*, which attain a height of four to six feet, are said to yield a strong fibre that might be utilized.

GOLDEN ROSE (Lat. *rosa aurea*). A rose formed of wrought gold, and blessed with much solemnity by the Pope in person on Mid-Lent Sunday, which is called, from the first word of the introit for the day, 'Lætare Sunday.' The prayer of blessing contains a mystic allusion to Christ as 'the rose of Sharon and the lily of the valley.' The rose is anointed with balsam, fumigated with incense, sprinkled with musk, and is then left upon the altar until the conclusion of the mass. It is then usually presented to some Catholic prince whom the Pope desires especially to honor, with an appropriate form of words. The origin of the ceremony is uncertain, but the most probable opinion as to its date is that of Martène and Du Cange, who fix it in the pontificate of Innocent IV. (1243-54). See LÆTARE MEDAL.

GOLDEN RULE, and RULE OF THREE. Terms once applied in arithmetic to designate the operation of simple proportion. See PROPORTION.

GOLDEN SEAL. See HYDRASTIS.

GOLDEN SECTION. A popular term for the division of a line segment in extreme and mean ratio. Given the line segment AB, if the



point P is found such that AB : AP = AP : PB, or AB × PB = AP^2, P is said to divide AB in golden section. The ratio of AP to PB is about 8 : 5. The theory of the golden section was known to the Pythagoreans, and was used by them in the construction of the regular pentagon. The first extensive treatment of the subject in modern times is that of Fra Luca Pacioli, whose work, *Divina proportione*, appeared in Venice in 1509; reprinted, with German translation, in the *Quellenschriften für Kunstgeschichte und Kunsttechnik des Mittelalters und der Neuzeit* (Vienna, 1889). The mediæval name, *Divine proportion*, has given place in modern times to *Sectio aurea*, or golden section. The ideas of Pacioli have recently been revived by Zeising, *Neue Lehre von den Proportionen des menschlichen Körpers* (Leipzig, 1854); id., *Der goldene Schnitt* (Leipzig, 1884), who has claimed the golden section as the æsthetic law in nature (see ÆSTHETICS), and by Bochenek, *Kanon aller menschlichen Gestalten und der Tiere* (Berlin, 1885), who has applied it in matters of art. Consult, also: Wittstein, *Der goldene Schnitt und die Anwendungen desselben in der Kunst* (Hanover, 1874); Pfeifer, *Der goldene Schnitt* (Augsburg, 1885); Matthias, *Die Regel vom goldenen Schnitt im Kunstgewerbe* (Leipzig, 1886).

GOLDEN SPUR. A Papal Order, founded probably by Paul IV., but also attributed to Constantine and to Pope Sylvester II. The decoration was so freely bestowed that the value was impaired, and the Order was reconstituted by Gregory XVI. in 1841. It is now conferred for special distinction and for services to the Catholic Church.

GOLDEN STAIRCASE. A famous stairway in the Doges' Palace, Venice, so called from its rich ornamentation.

GOLDEN STATE. California. See STATES, POPULAR NAMES OF.

GOLDEN TERGE, THE, or THE GOLDYN TARGE. An allegorical poem by William Dunbar, published in 1508 by Chepman and Myllar, and reprinted in 1834 in David Laing's complete collection of the poet's works. It describes Cupid as steadily repelled by Reason with a golden shield, until blinded by a subtle powder.

GOLDEN VERSES (Gk. ἔπη χρυσᾶ, *epē chrysa*). A traditional collection of gnomic sayings of the Pythagoreans, containing the teachings of virtue in practical form. The verses can be found in the second edition of *Hesiod*, by Göttling (Gotha, 1843).

GOLDEN WARBLER. The commonest of American wood-warblers (*Dendrœca æstiva*), more frequently called summer warbler, yellow warbler, or summer yellowbird. (See WARBLER.) The golden-winged warbler is a different but closely allied species (*Helminthophaga chrysoptera*), one of the swamp warblers (q.v.). Other warblers are designated 'golden-cheeked,' 'golden-crested,' etc.

GOLDEN WEDDING. See WEDDING ANNIVERSARIES.

GOLDEN-WINGED WOODPECKER. See FLICKER.

GOLDFINCH. (1) A pretty European finch (*Carduelis carduelis*), belonging to the Fringillidæ family. It is a favorite cage-bird, on account of its soft and pleasing song, its intelligence, its liveliness, and the attachment which it forms for those who feed and caress it. The goldfinch is about five inches in entire length;

black, blood-red, yellow, and white are beautifully mingled in its plumage. The colors of the female are duller than those of the male. It is widely diffused throughout Europe and some parts of Asia, and is to be seen in small flocks on open grounds, feeding on the seeds of thistles and other plants, or in gardens and orchards. Its nest is made in a tree, bush, or hedge, is remarkable for its extreme neatness, and is always lined with the finest downy material that can be procured. The eggs are four or five in number, bluish white, with a few spots and lines of pale purple and brown. The goldfinch is much employed by bird-catchers as a call-bird. It can be trained to the performance of many little tricks, such as the raising of water for itself from a well in a bucket the size of a thimble. It has been introduced into America, and is now fairly well established in the vicinity of New York City, and to a less degree about Boston. See Plate of CAGE-BIRDS.

(2) The American goldfinch (*Spinus tristis*), more generally called 'yellowbird' and 'thistlebird,' is very similar to the European species in habits and song, and displays the same interesting liveliness and affection in domestication. The nest is also of the same elegant structure. It is a common bird in most parts of North America. It is hardly five inches in length, and is bright yellow, with the crown, wings, and tail black. The female is much duller, grayish brown, more or less tinged with yellow beneath. In winter the male assumes a plumage very similar to that of the female. The goldfinch is eminently gregarious, except during the breeding season, and it seems loath to give up its social life, for it is the last of our birds to go to housekeeping; the eggs, which are spotless, are rarely laid before the end of June. The nest is a delicate cup of soft materials, sometimes wholly of vegetable down, and is placed in a bush or low tree. It is often invaded by the cowbird (q.v.), in which case the goldfinches are likely to construct a second story—i.e. a new nest on the top of the original one—burying their own and the strange egg, and laying a fresh set above. The flight of the goldfinch renders the bird easy to recognize on the wing, for it is always in a series of undulations, and generally is accompanied by a faint sweet twitter, which one writer translated as 'per-chick′-o-pee.' Several closely related species are found in the Southwestern United States and in Mexico.

GOLDFISH, or GOLDEN CARP. A fish (*Carassius auratus*) closely related to the carp, a native of China, but now domesticated and naturalized in many parts of the world. It has been long common in many of the fresh waters of China, and was introduced into England about the end of the seventeenth or the beginning of the eighteenth century. On account of the brilliancy of its colors and the ease with which it is kept in glass globes or other vessels in apartments, it soon became, and has continued to be, a general favorite. Its ordinary length is five or six inches, but it has been known to reach a foot. When young it is of a blackish color, but acquires its characteristic golden red as it advances to maturity, some individuals (*silverfish*) becoming rather of a silvery hue. Monstrosities of various kinds are frequent, particularly in the fins and eyes, a favorite Japanese variety having three large tails. Culturists can induce and strengthen the artificial golden color by controlling the amount of mineral in the water. Goldfish are easily kept in small glass aquaria. There should be some sort of water plant in the water, which should not be cold, and should be changed in part every few days. Occasional sunlight is good, to prevent the growth of fungi. The safest food is that prepared and sold for the purpose. Escaped specimens naturalized in rivers (as in the Potomac) revert to their native olivaceous green hue. An artificial grotesque variety is illustrated on the Plate of CARP AND ALLIES.

GOLDFUSS, gōlt′fōōs, GEORG AUGUST (1782-1848). A German paleontologist and zoölogist. He was born at Thurnau, near Bayreuth, Bavaria, and was educated at Berlin and Göttingen. During the last thirty years of his life he was professor of mineralogy and zoölogy at Bonn, where he was also appointed director of the Zoölogical Museum. Besides his principal work, *Petrafacta Germaniæ* (partly in collaboration with Count zu Münster, 1826-44), he published *Grundriss der Zoologie* (2d ed. 1834). He is said to have been the first to introduce the term 'protozoa' into scientific nomenclature.

GOLD′ING, ARTHUR (c.1536-c.1605). An English writer and translator. He was born probably in London, and is said to have studied at Queen's College, Oxford. He was a friend of Sir Philip Sidney, who, on leaving for the Low Countries, intrusted to him the completion of the translation of Philippe de Mornay's treatise, *De la vérité de la religion chrétienne*, which Golding published under the title *A Woorke Concerning the Trewenesse of the Christian Religion* (1589). He made many translations, devoting himself especially to those from the works of Calvin and Theodore Beza, but will be remembered chiefly for his rendering into English, in ballad metre, of the 'fyrst fower bookes' of Ovid's *Metamorphoses* (1567).

GOLD LACE. A fabric formed by weaving silken threads that have been previously gilded. The peculiarity of this manufacture consists in the gilding of the silk in such a manner that it shall retain sufficient flexibility for weaving. A deep yellow or orange-colored silk is used for the purpose. The usual method of doing this is by what is called 'fibre plating.' A rod of silver is gilded by simply pressing and burnishing leaves of gold upon it. This gilded silver is then drawn into very fine wire, so fine that one ounce of metal can be extended to the length of more than a mile. It is then flattened between polished steel rollers, and further extended, so that a mile and a quarter weighs only one ounce; for the last drawing the wire is passed through perforated gems, such as diamonds or rubies. The film of gold upon this flattened wire is much thinner than beaten gold leaf, and has frequently been quoted as an example of the divisibility of matter, as one inch of the highly gilded wire contains but the eighty-millionth part of an ounce of gold, while $\frac{1}{100}$ of an inch, which is a visible quantity exhibiting the color and lustre of gold, contains but $\frac{1}{80000000}$ of an ounce; or, in other words, one ounce of gold covers a length of wire of more than 100 miles. This flattened gilded wire is then wound over the silk, so as to inclose it completely, and produce an apparently golden thread. Other means of directly gilding

the thread have been tried, and for some purposes are successful; but none have yet been discovered which give the thread the same degree of lustre as the above, which was first practiced in a ruder manner by the Hindus. Much of the so-called gold lace of commerce is made of an alloy known as Dutch metal. SILVER LACE is made in the same manner as gold lace, except that the gold coating is omitted. Both gold and silver lace are used extensively for military and other uniforms, and for ornamental effects in women's apparel.

GOLD LEAF. See GOLD-BEATING.

GOLDMARK, gōld'märk, KARL (1832—). An Austrian composer. He was born in Keszthely, Hungary, and, musically, was largely self-taught, although he had some instruction on the violin from Jansa in Vienna in 1844, and three years later took lessons in composition from Böhm. Firmly believing in his musical talent, he devoted himself almost entirely to composition. Overcoming the most difficult obstacles, he so far succeeded as to give his first public concert in Vienna at the age of twenty-six years, a pianoforte concerto of his own being a feature of the programme. Outside of Germany he is better known through his orchestral suites and arrangements and smaller instrumental and vocal compositions than for his operas, although in his own country, as well as in Germany, they are regarded as standard. His published works include: Operas—*Die Königin von Saba*, his chief operatic success (1875); *Merlin* (1886); *Das Heimchen am Herd* (1896, from Dickens's *Cricket on the Hearth*); *Die Kriegsgefangene* (1899); and several others not yet published or produced in public. The overtures to *Prometheus Bound* and to *Sappho* are universal favorites. Other compositions are: *Sturm und Drang* (for pianoforte, op. 5). Symphonies—*Landliche Hochzeit*; the *Sakuntala* overture (op. 13), a well-known concert work; and *Im Frühling*; Scherzo in A (for orchestra); songs, choruses, etc.

GOLD OF PLEASURE, FALSE FLAX (*Camelina*). A genus of plants of the order Cruciferæ. The common gold of pleasure (*Camelina sativa*) (Fr. *Cameline*, Ger. *Dotter*) is an annual, one and a half to three feet high, with smooth, bright green, entire or slightly toothed leaves, the middle stem-leaves arrow-shaped and embracing the stem, and terminal racemes and pear-shaped pouches. Notwithstanding its high-sounding English name, the plant is of humble and homely appearance. It grows in fields and waste places of Europe and the north of Asia, but is not regarded as a native of America, although often found in fields, particularly of flax. Its seed is very commonly mixed with flaxseed imported from other lands. In many parts of Germany, Belgium, and the south of Europe it is extensively cultivated for the sake of its seeds, which are rich in oil, and the oil cake of which, as well as the seeds, though inferior to linseed and linseed-oil cake, is also used for feeding cattle. The oil, although sweet and pure at first, is very apt to become rancid, and is less valued than that of rapeseed or colza, with which it is often mixed. The value of the plant in agriculture depends much on its adaptation to poor sandy soils, although it prefers those of a better quality; and on account of its rapid growth, to secondary cropping and green manuring. Since it readily scatters seed, it is likely to become a weed pest; it is not much cultivated in any part of America. The stems, which are tough, fibrous, and durable, are used for thatching and making brooms; their fibre is even used for coarse paper. See CAMELINA.

GOLDONI, gōl-dō'nē, CARLO (1707-93). The most celebrated Italian writer of comedy. He was born in Venice, February 25, 1707, of a good family, which lost its property in his childhood. His father, a physician, took him to Perugia, where he first entered school. He was encouraged by his father in his strong taste for the literature of classic comedy, and was given an opportunity for practice on the amateur stage. But the boy showed no aptitude for such performances, and was sent to Pavia to study for the Church. Still less fitted, however, for being an ecclesiastic than for being an actor, he was finally expelled from college for writing scurrilous satires. He studied law, and was admitted as an advocate, getting his degree from Padua in 1732, after his father's death. But the legal profession did not prove lucrative, and he relinquished its practice to set about composing comic almanacs, which became highly popular. In this early part of his career he wrote a few tragedies, among them *Belisario*, and several of his minor comedies were represented, attracting public favor by their novelty as well as their merits. In 1736 he married the daughter of a notary of Genoa, and about 1740 was for a short time consul of Genoa at Venice. Financial difficulties, however, occasionally hampered him in literary work, until, having obtained an introduction to Prince Lobkowitz, he was intrusted with the composition of an ode in honor of Maria Theresa, and with the organization of the theatrical entertainments of the Austrian Army. Subsequently for a time he lived at Florence and Pisa. He returned to Venice in 1747 to write for a manager named Medebac, and five years later he made still more lucrative arrangements at the Theatre of Saint Luke, where much of his best work was done. In 1761 he was invited to France, where he was soon appointed Italian master to the royal children, a situation which allowed him to devote himself tranquilly to his literary occupations. He began after a time to write in French, and *Le bourru bienfaisant*, composed for the wedding of Louis XVI., excited the admiration even of Voltaire. On the breaking out of the Revolution Goldoni lost his pension, but after his death (February 6, 1793) it was restored to his widow. He left about one hundred and fifty comedies of very unequal merit, some of the most noted of which are: *La donna di garbo; La bottega del caffè; La locandiera; Il giocatore; Il vecchio bizzarro;* and *L'adulatore*. His ambition was to dispense with some of the conventional accessories of the comic stage of his time, and elevate that branch of the national drama from the buffooneries into which it had fallen. In this he succeeded. He was a great admirer of Molière, and the larger part of his works are inimitable representations of the events of daily life, under both their simplest and their most complex aspects.

Consult: the *Memoirs of Carlo Goldoni*, trans. by John Black, with an essay by Howells (Boston, 1877); Gherardini, *Vita di Carlo Goldoni*, prefixed to the collected comedies (Milan, 1821); Molmenti, *Carlo Goldoni* (Venice, 1875); Galanti, *Goldoni e Venezia, nel secolo XVIII.* (Padua,

1883); Rabany, *Carlo Goldoni: Le théâtre et la vie en Italie au XVIIIème siècle* (Paris, 1896); Copping, *Alfieri and Goldoni, Their Lives and Adventures* (London, 1857); *Lettere di Carlo Goldoni, con prefazione e note di G. M. Urbani* (Venice, 1880). The most complete edition of his plays is that of Venice, 1788, republished in Florence in 1827.

GOLDS. A people of the Lower Amur and the Usuri, in Southeastern Siberia, belonging, physically and linguistically, to the Tungusic group of Siberian peoples. Deniker (1900) describes them as "of a very pure type, and having a fairly well developed ornamental art." Laufer, who visited them in 1898-99, notes the great influence of Chinese symbolism and ornamental *motifs* upon the art products of the Golds; the dragon and the cock seem to have been introduced thus. The Golds have a rich mythology (with many archaic words and phrases), a considerable portion of which has evidently originated in Mongolian Central Asia. From the Chinese some of the Golds have learned the art of silk-embroidery, in which they display great skill. Although fishers and hunters generally, a portion of them have taken to agriculture with not a little success. They are said to be losing of late years their individuality through the mania for Russian fashions, etc. Laufer informs us that "a tendency to rationalism, due perhaps to continuous contact with Chinese culture, is one of the distinguishing traits of the Gold's character." It is to this 'preponderance of intellect' that Laufer attributes the absence of many ceremonies, feasts, etc., among the Golds, and the dying out of belief in the old shamans, whose place the Russian physician now takes. Marriages of Golds and Chinese are said to be often infertile. A primitive people, under the influence of such differing cultures as the Chinese and the Russian, the Golds are of considerable ethnological importance. The best recent account of the Golds and other tribes of the Amur will be found in Schrenck, "Die Völker des Amurlandes," vol. iii. of his *Forschungen in Amurland, 1854-56* (Saint Petersburg, 1881-91); and Laufer, "The Amoor Tribes," in the *American Anthropologist* (New York) for 1900.

GOLDS'BORO. A city and the county-seat of Wayne County, N. C., 49 miles southeast of Raleigh; on the Neuse River, and on the Southern, the Atlantic Coast Line, and the Atlantic and North Carolina railroads (Map: North Carolina, E 2). It has Hermann Park, an Odd Fellows' Orphan Home, the Eastern Insane Asylum (colored), and a State Normal School for negroes. The city is the commercial centre for an agricultural and cotton-growing section; its industrial plants include cotton-mills, oil-mills, furniture-factories, agricultural-implement works, machine-shops, a mattress-factory, etc. Goldsboro was settled in 1838, and was incorporated three years later. Under a charter of 1901, the government is vested in a mayor, elected every two years, and a council. The water-works and electric-light plant are owned and operated by the municipality. Population, in 1890, 4017; in 1900, 5877.

GOLDS'BOROUGH, Louis Malesherbes (1805-77). An American naval officer, born at Washington, D. C. He was appointed a midshipman in the navy in 1812, when only seven years old, but did not enter upon active duty until 1816. He served on the Mediterranean and Pacific stations, and was promoted a lieutenant in 1825. He then spent two years in study in Paris on leave of absence. In the following year, 1827, being again on duty in the Mediterranean, he distinguished himself by rescuing an English brig which had been captured by pirates in the Grecian Archipelago. In 1833 he retired from the navy, and settled in Florida, where he recruited and commanded a company of volunteer cavalry during the Seminole War. Returning again to the navy, he was promoted commander in 1841, and served in the Mexican War, acting as executive officer of the frigate *Ohio* at the bombardment of Vera Cruz. In 1849 he was a member of the joint army and navy commission in California and Oregon; was superintendent of the United States Naval Academy at Annapolis from 1853 to 1857, during which period (1855) he attained the grade of captain; and from 1857 to 1861 was again at sea. He was made flag-officer at the outbreak of the Civil War, and on the abolition of that rank in 1862 became rear-admiral. His first service was with the North Atlantic blockading squadron in September, 1861. He commanded the fleet which coöperated with General Burnside in his North Carolina expedition in 1862; commanded the European Squadron in 1865-67, and subsequently was commandant of the navy yards at Mare Island, California, and at Washington. In 1873 he retired from active duty as senior officer in point of length of service.

GOLDSCHMID, gölt'shmīt. See Fabricius, Georg.

GOLDSCHMIDT, Adalbert von (1853—). A German composer. He was born at Vienna, and was educated at the conservatory in that city. Although not a musician by profession, he acquired an excellent reputation as a composer, notably through his three-part cantata *Die sieben Todsünden*, based upon the celebrated poem by Robert Hamerling. The cantata was first performed at Berlin in 1875. In 1884 Goldschmidt brought out an opera entitled *Helianthus*, which was followed, in 1889, by a trilogy, *Gæa*.

GOLDSCHMIDT, Herman (1802-66). A German painter and astronomer. He was born at Frankfort, June 17, 1802, the son of a Jewish merchant. For ten years he assisted his father in his business, and studied painting at Munich under Cornelius and Schnorr. In 1836 he established himself in Paris, where he painted a number of pictures of average merit, among which may be mentioned the "Cumæan Sibyl," an "Offering to Venus," a "View of Rome," the "Death of Romeo and Juliet," and several Alpine landscapes. In 1847 he began to devote his attention to astronomy; and from 1852 to 1861 he discovered fourteen asteroids between Mars and Jupiter, on which account he received the grand astronomical prize of the Academy of Sciences. His observations of the protuberances on the sun, made during the total eclipse on July 10, 1860, are included in the work of Mädler on the eclipse, published in 1861. He died at Fontainebleau, September 10, 1866.

GOLDSCHMIDT, Jenny Lind. See Lind, Jenny.

GOLDSCHMIDT, Meyer Aaron (1819-87). A Danish publicist and novelist, born at Vording-

borg, of Jewish parents. In 1847 he founded the periodical *Nord og Syd*, which, under his management, became an influential political organ. In 1861 he established the weekly paper *Hjemme og Ude*. He was a gifted story-teller, and his descriptions of Jewish life have never been surpassed. His numerous novels and fables include: *En Jöde* (1845, Eng. trans. under the title *The Jew of Denmark*, by Mrs. Bushby, 1852); *Hjemlös* (1853; Eng. trans. by the author under the title *Homeless; or, A Poet's Inner Life*, 1861); *Rabbien og Ridderen* (1869); *Kjærlighedshistorier fra mange Lande*, a series of love-tales of various lands (1867); and *Avrohmche Natteryal* (1871).

GOLDSCHMIDT, Otto (1829—). A German-English pianist, conductor, and composer. He was born at Hamburg, and was a pupil of Jakob Schmitt, Mendelssohn, and Chopin. In 1851 he accompanied Jenny Lind on her American tour, and married her at Boston in the following year. After a sojourn of three years at Dresden (1852-55), the couple removed to London in 1858, after which Goldschmidt was prominently identified with the musical life of the British capital. He successively became professor and vice-principal of the Royal Academy of Music (1863), and director of the Bach Choir (1876-86), a society founded by him in 1875. He also, on several occasions, conducted the celebrated Lower Rhine Festivals at Düsseldorf. Among his principal musical publications are: *Ruth*, an oratorio (1867); *Choral-Book for England* (with Julius Benedict); a pianoforte concerto, op. 10; a pianoforte trio, op. 12; and several other pianoforte compositions and songs. After the death of his wife (1887) he was instrumental in securing the publication of her biography (1891).

GOLDSINNY, or **GOLDFINNY**. A small, bright yellow European wrasse (*Symphodus melops*), frequenting rocky coasts, and sometimes taken by anglers.

GOLD'SMITH, Lewis (c.1763-1846). An English journalist, whose parents or grandparents were Jews from Portugal. He was born in London, and was educated there for the law. A strong sympathizer with the Revolutionists in France and Poland, he used his pen in their behalf after his return to London from a Continental sojourn. In 1802 he edited a tri-weekly paper in the interests of Napoleon. The Emperor demanded of him services of espionage and intrigue that he refused to render, and he left his French post in 1809, establishing himself in London as a notary and journalist. He was well equipped to revile his Revolutionary associates, and did so with a free pen, attacking Napoleon's moral character, and becoming an ardent partisan of Louis XVIII. He became a disciple of Robert Owen in England, and lived to be a very old man.

GOLDSMITH, Oliver (1728-74). An English author. He was born in the village of Pallas, County of Longford, Ireland, November 10, 1728. His father, Rev. Charles Goldsmith, a clergyman of the Established Church, was at that time curate to the rector of Kilkenny West. When six years old, Oliver was placed in the village school kept by an old soldier, Thomas Byrne, described in "The Deserted Village." While there he suffered permanent disfigurement from a bad attack of smallpox. He subsequently attended other small schools, and at length entered Trinity College, Dublin, as a 'sizar,' or poor scholar (June 11, 1744). Neither at school nor at the university did he display any conspicuous talents. But he had long been interested in chapbooks and the ballads of the peasantry, and had attempted verse. Disliking his tutor and his studies, humiliated by his position, and becoming involved in a college riot, he sold his books and ran away to Cork. Through the influence of his brother Henry, he was induced to return to the university, where he was graduated B.A. (February 27, 1749). His uncle, Rev. Thomas Contarine, who had helped Goldsmith at the university, now tried to induce him to take orders; but he either declined or was rejected by the Bishop of Elphin. Thereupon he went to Cork to embark for America, but missed his ship. His uncle next gave him £50 to study law in London; but Goldsmith soon returned, having got no farther than Dublin, where he lost his money at a gaming-house. Again aided by Contarine, he succeeded in reaching Edinburgh, where he began the study of medicine in 1752; but toward the end of the next year he sailed for Leyden, and then set out on the grand tour, wandering on foot through Flanders, France, Germany, and Italy, paying while in France for the hospitality of the peasants by playing on his flute. In 1756 he returned to England with empty pockets, and soon began to practice medicine in Southwark. He quickly abandoned his profession to become, in turn, proof reader, usher in an academy at Peckham, and then hack-writer at 'an adequate salary' for the *Monthly Review*. In 1758 he was nominated physician and surgeon in the India service, but the appointment was not confirmed; and being examined the same year at Surgeons' Hall for the post of 'hospital mate,' he was found 'not qualified.' The very clothes in which he appeared before his examiners were borrowed; and, being in great distress, he pawned them.

Besides several articles in the *Monthly Review*, Goldsmith had by this time translated the *Memoirs of Jean Marteilhe of Bergerac* (1758). In April of the next year he attracted some attention by the *Enquiry into the Present State of Polite Learning in Europe*. He was employed on three periodicals started in this year, writing probably all the articles for the *Bee*, a weekly that ran through only eight numbers. On January 24, 1760, he contributed to the *Public Ledger* the first of the celebrated *Chinese Letters*, republished two years later under the title of *The Citizen of the World*. In 1762 appeared also the *Life of Richard Nash*, the famous Bath beau. His literary work had already gained him the friendship of Bishop Percy and Dr. Johnson. In 1764 the Literary Club was founded, and Goldsmith was one of the nine original members. He was thus brought into intimacy with some of the most eminent men of the time. This year he published *A History of England*, in a series of letters, which was followed by "The Traveler" in 1765, a poem which placed him at once in the front rank of contemporary writers. The following year came his only novel, *The Vicar of Wakefield*, which, with all its faults, is one of the most delightful stories in English literature. It has passed through more than a hundred editions. Turning now to the drama, he produced *The Good-Natured Man*, performed at Covent Garden,

January 29, 1768. It did not meet with great favor. Disheartened, he turned again to hack work; but in 1770 he published his finest poem, "The Deserted Village." On March 15, 1773, *She Stoops to Conquer*, unsurpassed among later English comedies, was performed at Covent Garden, and met with instant success. Goldsmith died in his chambers at the Middle Temple, April 4, 1774, and was buried in the grounds of the Temple Church. The Literary Club erected a monument to his memory in Westminster Abbey, bearing an epitaph of Dr. Johnson. His statue stands at the portal of Trinity College, Dublin. While Goldsmith was producing his finest work, he was also compiling histories and writing reviews. Among productions not mentioned above are: *The Grecian History* (1774); the incomplete *History of Animated Nature* (1774); and the delightful poems, "Retaliation" (1774) and "The Haunch of Venison" (1776). Goldsmith was the most natural English genius of his time. He did not possess Johnson's massive intellect, nor Burke's passion and general force; but he wrote the finest poem, the most charming novel, and—with the exception perhaps of *The School for Scandal*—the best comedy of the period. Than his style, nothing could be more natural, simple, and graceful. For his *Life*, consult: Forster (London, 1848; enlarged ed. 1854); Irving (New York, 1849); Black, in *English Men of Letters* (London, 1879); and Dobson, in *Great Writers* (London, 1888); also Boswell, *Life of Dr. Johnson* (London, 1889); and the Wakefield edition of the *Complete Works* (12 vols., London, 1900).

GOLDSMITH BEETLE. A large scarabæid beetle (*Cotalpa lanigera*) of the Eastern United States, allied to the dung-beetles, and golden yellow in color. It is especially fond of willow-trees, where it hides and nests among the leaves in the daytime, going abroad only at night. It deposits its large eggs singly in the soil, and the larval stages, which extend over about three years, are passed underground. The name is applied in a more general way to all the beetles of the group Rutelinæ, of which many of the largest and most brilliantly metallic inhabit Central America.

GOLDSMITH'S MAID. A bay trotting mare, sired by Abdallah, and famous between 1866 and 1878. In 1871 she took the mile trotting record from Dexter in 2:17; but in 1874 was beaten by Rarus (2:13¼).

GOLDSMITHS' NOTES. The earliest form of bank-notes; so called because goldsmiths were the first bankers.

GOLDSMITH'S WORK. Metal-work of the finest and most elaborate, though not always the most artistic sort, such as is done with gold, with electron or with silver gilt, which last is so much used in decorative art as to be admitted as a metal—the French *vermeil* being used in recent times in this sense alone. Goldsmith's work includes repoussé work (q.v.), and soldering of part to part, including the attaching of minute balls or grains of gold, a system followed very largely in antiquity. It includes also striking with the die and the punch, and saw-piercing, spinning, and other industrial processes especially in use in the making of cheaper and more showy work. Enameling is in use for all kinds of goldsmith's work, as an added adornment. Goldsmith's work is divisible into the two main departments of plate and jewelry, or the making of vessels and receptacles of all sorts on the one hand, and the making of personal adornments, on the other hand. There are some pieces of work that seem to hold a place half way between these departments; thus the making of watch-cases, if they are other than plain circular cases of no elaboration of ornament, that is, if they are embossed, incrusted with enamel, or set with jewels, may be very refined goldsmith's work, hard to classify. In this connection may be mentioned the peculiar technical matter of perfect box-making, a thing which is rare in European goldsmith's work. Thus a watch-case, twelve-sided or sixteen-sided instead of round, and with four or five separate rims and edges to fit one upon another, is a triumph if it has not visible flaws; and the best adjustment of very fine and delicate hinges is also a great virtue in fine work.

The most refined in design of all goldsmith's work is that done under Greek influence in antiquity. Not many specimens of it remain, and we are ignorant how general was the use of the more difficult and delicate mechanical processes; for much of the gold found in tombs is roughly and slightly made, as if a mere simulacrum—a conferring upon the dead a mere semblance of the objects beloved during life. The few gold vases and similar large objects that have come down to us are of a period later than the central epoch of Greek art; moreover, they are generally the 'finds' of explorers in remote provinces—Kertch on the Black Sea or in the Spanish Peninsula, or in the lands of the Lower Danube, like Petrossa, near Bucharest, in the Kingdom of Rumania. The goldsmith's work that we study most carefully for suggestions in design is that of the Middle Ages, and the Renaissance for the large pieces, like liturgical vessels, and that of the eighteenth century for small objects of personal use; but personal jewelry is, in the main, of modern origin in its design and manufacture. It is rare, however, to find in modern work any special artistical merit. The demand for very costly stones set in a showy way by those who alone can afford to spend money liberally makes the evolution of highly organized design in metal-work very difficult. See JEWELRY.

GOLD STICK. A superior officer in the English Royal Body-Guard, and a captain in the Corps of Gentlemen-at-Arms. They are so called because, on state occasions, they carry a gilded baton.

GOLDSTÜCKER, gōlt'stu-kĕr, THEODOR (1821-72). A German-English Sanskrit scholar. He was born of Jewish parents at Königsberg, Prussia, and was educated at that city and in Bonn and Paris, where he was collaborator with Burnouf on the *Introduction à l'histoire du Bouddhisme indien*. After a visit to England and a sojourn of two years at Königsberg, he went to Berlin, where he contributed valuable material on Indian affairs to Humboldt's *Kosmos*. Soon afterwards he went to England, and in 1852 was appointed professor of Sanskrit at University College, London. During an activity of nearly thirty years at that institution, he did much toward the advancement of Oriental science. He was an able controversialist, but frequently permitted himself to be carried too far in his attacks on such distinguished scholars of the German school as Böhtlingk, Weber, and others. His writings include:

On the Deficiencies in the Present Administration of Hindu Law (1871); *Pānini, His Place in Sanskrit Literature* (1861); an anonymous translation of Krishna Miśra's *Prabōdha-Chandrodaya* (Königsberg, 1842); and his posthumous edition of the *Mahābhāshya* (3 vols., London, 1874). Many of his minor contributions are collected in his *Literary Remains* (London, 1879).

GOLD THREAD. See COPTIS.

GOLDTIT, or VERDIN. A most curious little bird (*Auriparus flaviceps*) of the titmouse family (Paridæ). It is four inches long, and abundant in the valleys of the Rio Grande and Colorado and in Lower California. The upper parts are ashy, the under parts whitish, and the whole head golden yellow. Its habits and manner partake of those of both the chickadees and the warblers; and it makes a remarkable nest, often as large as a man's head, woven of twigs into a globular mass, and placed in a thorny tree. It is lined with down and feathers, and the eggs are four to six, pale bluish speckled with brown. Consult Coues, *Birds of the Colorado Valley* (Washington, 1878).

GOLD WASP. See CUCKOO-FLY.

GOLDZIHER, gōlt'tsē-ēr, IGNAZ (1850—). An Hungarian Orientalist, born at Stuhlweissenburg. He studied at the universities of Budapest, Berlin, and Leipzig, and made special investigation of Oriental manuscripts in the libraries of Leyden and Vienna. He was appointed a lecturer at the University of Budapest in 1872, and became professor there in 1894. In 1876 he was elected a corresponding member, and in 1892 a full member of the Hungarian Academy. He visited Egypt, Syria, and Palestine in 1873-74. His writings in Hungarian comprise a large number of contributions to the publications of the Academy, including papers on Oriental bookmaking (1874), on the history of philological study among the Arabs (1878), and on the progress and results of archæology in Palestine (1886). His chief publications are in German, among them such scholarly works as: *Studien über Tanchûm Jerûschalmi* (1871); the treatise *Der Mythos bei den Hebräern und seine geschichtliche Entwicklung* (1876; in an English translation, London, 1877); and *Mohammedanische Studien* (2 vols., 1889-90). Goldziher is considered one of the foremost European scholars in subjects connected with Mohammedanism.

GOLET'TA. The port of Tunis, Africa.

GOLF (probably from Dutch *kolf*, OHG. *cholbo*, Ger. *Kolbe, Kolben*, club, Icel. *kolfr*, bolt, *kylfa*, club). The game of golf is of Scottish origin. When James VI. of Scotland succeeded Queen Elizabeth on the English throne, his Scottish train played the game on Blackheath: whereby came about the curious fact that the oldest organized golf club is English. It was an exotic, however, and remained the only one south of the Tweed for two hundred and fifty years. Meanwhile in Scotland the game maintained its popularity, and was so generally indulged in by all classes of society that any village in East Lothian could be sure of competitors, from the village cobbler to the laird of the neighborhood. The early conditions were as democratic as the company.

A tent erected upon special occasions was the only rendezvous of the local golfers; and the links were laid out across a tract of commonland by the seaside, over which every inhabitant of the district had some right. The prize was seldom more than a club with a silver band round it; or a dozen balls; or later on a simple medal; even the great national prize was only a silver club, and that never became the property of the winner. The association for which the winner played had its custody until the next yearly contest. The earliest implements with which it was played were practically as good as they are to-day, except in the case of the balls, which were formerly made of a leather case stuffed with feathers. The two great Scotch associations, while younger than the English one mentioned above, are of far greater importance to the history of the game. The Honorable Company of Edinburgh Golfers was in organized existence previous to 1744. Its members played on the links of Leith until 1831, and from 1836 have played at Musselburgh. The Royal and Ancient, more popularly known as Saint Andrew's of Scotland, was established in 1754, and ever since has been the acknowledged leader in the sport. The first clubs established outside Great Britain were the Calcutta Golf Club of East India, established in 1829, and the Royal Bombay Club, incorporated in 1842. Another club was in full vigor in Madras at a somewhat later date. The next foreign settlement was at Pau, in Southern France, where numerous Scotchmen were in search of health. It was not until 1864 that the invasion of England proper began, with the establishment of the Golf Club of Westward Ho, in Devonshire, followed in the next year by the London Scottish, at Wimbledon; and shortly afterwards by the Hoylake, at Liverpool; and then by hundreds of others throughout the country. Canada caught the infection in the early seventies, resulting in the organization of the Royal Montreal Golf Club in 1873. In the United States, New York (1890) was the first to take up the game, followed almost immediately by the country at large, so that at the beginning of the twentieth century public links were to be found in the public parks of the large cities, and nearly every town and village in the country had its public or private golf-links.

The game is played with a ball made of gutta-percha having a diameter of 1¾ inches and weighing from 26 to 28 pennyweights, hit with such one of the clubs used as is most suitable for the accomplishment of a particular stroke. It is played over a course laid out over an open stretch of country, and the object is to hit the ball into each of the holes made for its reception successively in the fewest number of strokes. The number of holes is usually eighteen, but where the area available is limited, nine played twice round are made to do service. The distance of each hole from the striking-off place (or tee) depends upon the nature of the intervening land; from 100 to 600 yards is the usual limit. In laying them out advantage is taken of such natural obstacles to straightforward play as ditches, walls, trees, hills, roads, or hollow places, so as to break up the total length into difficult portions, compelling the player to exercise judgment and skill. If there are no natural obstacles, or hazards, artificial ones are introduced, such as a bunker made by hollowing out the earth and leaving it loose like sand in front of a hole, or an embankment raised at some selected spot. The game

is played mostly by twos (singles), though sometimes by two pairs (or foursomes), and it may be either 'medal play' or 'match play.' In the former all the strokes of the game are added together at the end of the eighteen holes, and he who has completed the round in the lowest number of total strokes wins; or, if match play, each hole is counted separately to the one who makes it in the fewest strokes, the winner being the one who has most holes to his credit.

The play is begun by one player placing his ball on the tee, or striking-off place, and striking it with one of his clubs, called the driver, such a distance as will best land it in a favorable place for the next stroke. Then his opponent drives off, and they both proceed to where their respective balls have fallen. In the ensuing strokes, and the choice of clubs with which to make them, the players must be guided by conditions — the length of the hole, the conformations of the ground to be covered, and the obstacles to be safely passed. The game is divided into three parts, distance shots, approaching, and putting. For the distance shots three clubs are generally used, the driver and the brassie, made of wood, and the cleek, made of steel. When the ball has been driven to within one hundred or one hundred and fifty yards of the hole, the approach shot, of which the object is accuracy rather than distance, may be made by using the mid-iron or the mashie. Around the hole the grass is cut short and the ground made as level as possible. This is called the putting-green. Putting, the third department of the game, consists of tapping the ball lightly with a short club with the object of rolling the ball into the hole, which is four and one-half inches wide. The conventional kit of clubs consists of the driver, the brassie, the cleek, the mid-iron, the mashie, and the putter. There are, however, variations of these types, such as the spoon, the driving-mashie, the lofter, the cran-cleek, the hollow-faced cleek, the jigger, and the niblick, the last-named club being by reason of its shape and weight of particular value in playing out of sand or long grass.

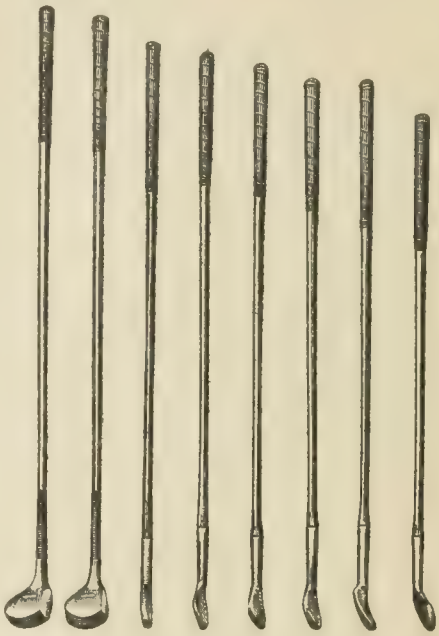
The rules are based upon those of the Saint Andrews Club of Scotland. Players are of two classes, professional and amateur, and the national championships are three: One for men (amateurs), one for women (amateurs), and an open championship for men, amateurs being at liberty to enter.

In America the central authority is the United States Golf Association, organized December 22, 1894, when it consisted of the Chicago Golf Club, the Country Club of Brookline, the Newport Golf Club, and the Saint Andrews Golf Club of Yonkers. It now (1902) consists of nearly two hundred clubs, and there are subsidiary associations, the Metropolitan, Western, Southern, Intercollegiate, Western Pennsylvania, and Florida Golf associations, the League of the Lower Lakes, the Pacific Northwest, New Jersey State, Indiana State, and several women's associations. Not included in these associations are hundreds of separate clubs.

In the men's amateur championship the entries are reduced by a preliminary sifting at medal play to the 64 lowest. These then play match play every consecutive day, whereby the numbers are day by day reduced, first to 32, then to 16, then to 8, then to 4, and finally to 2. The women's championship is not so exhaustive as the men's. In it the entries are reduced by one round at medal play to 32, who thereafter meet at match play in a round of 18 holes every consecutive day, as in the former case.

The open championship is a contest of four times round the links, 72 holes, at medal play.

Consult especially: Clark, *Golf: A Royal and Ancient Game* (New York, 1899); Kerr, *The Golf Book of East Lothian* (Edinburgh, 1896); Lee, *Golf in America* (New York, 1895); Travis, *Practical Golf* (New York, 1901); Hutchinson, *Golf*, "Badminton Series" (London, 1890).



GOLF CLUBS.

1. Driver. 2. Brassie. 3. Cleek. 4. Driving mashie. 5. Mid-iron. 6. Mashie (ordinary). 7. Mashie (Taylor). 8. Putter.

GOL'GOTHA. See HOLY SEPULCHRE.

GO'LIAD. The county-seat of Goliad County, Tex., 134 miles south of Austin; on the San Antonio River, and on the Southern Pacific Railroad. It contains a fine court-house and interesting remains of the old Spanish mission, La Bahia. The town has cotton-gins and cottonseed-oil mills, the products of which with live stock constitute a considerable trade. Population, about 2000. Here in 1747 was established the mission Espíritu Santo de Zuñiga, and the presidio of Santa Maria de Loreto del Espíritu Santo, generally known as 'La Bahía,' which had been founded about 1722 on the site of La Salle's Fort Saint Louis, and removed to the Guadalupe River about 1727. In 1829 the place was raised to the rank of a villa, and was named Goliad (Goliath). In 1812-13 during the war between Mexico and Spain, Gutierrez was besieged here for a short time by a large Spanish force; on October 9, 1835, the place, then garrisoned by a Mexican force of about 50, was captured by an equal number of Texans under Captain Collingsworth. On December 20, 1835, a declaration of Texan independence was made here, several months before the official

1. THE TOP OF THE SWING
2. THE END OF THE SWING
3. A HALF SHOT
4. ADDRESSING THE BALL

declaration was made at Washington (Texas), and on March 27, 1836, in what is known as the 'massacre of Goliad,' more than 300 Texans and Americans under Colonel Fannin were murdered near here in cold blood by the Mexicans, at Santa Anna's orders. See FANNIN, JAMES W.

GO'LIAR'DIC LITERATURE, or CARMINA BURANA. The songs of the wandering students in the later Middle Ages. These called themselves Goliardi, i.e. children or followers of Golias. Nothing is definitely known about this Golias. By some the poems bearing his name have been attributed to Walter Mapes, but there is no possibility that the songs of the Goliards represent the creation of any one man or even of a few men. They bear the stamp of universality. A song, originally sung by one poet or rhymester, was adopted, changed, resung, by others, until it became the common property of the student body. The poems as a whole may be divided into two general classes. The first class comprises the satirical songs. With the impatience and enthusiasm of youth the students attacked the vices of all classes except their own, and of course the members of the Church fared worst. Their poems are exceedingly irreverent to the ecclesiastical dignitaries, and this fact alone was sufficient to prevent any author from putting his name to his verses. In the second class the noticeable facts are the purely pagan spirit, the love of outdoor life, the zest for enjoyment, the feeling that all things which yield pleasure are lawful. Their themes are three: nature, wine, and women, all of which they loved ardently. Some of their songs are popular at the present time. The German Corps-students still sing at the grave of a departed brother, *Gaudeamus igitur, juvenes dum sumus.* The best known of the drinking songs is *Meum est propositum in taberna mori.* The *Lauriger Horatius* is believed to be the work of the Goliardi. Consult: Symonds, *Wine, Women, and Song* (London, 1884); Schmeller, *Carmina Burana* (3d ed., Breslau, 1894); Wright, "Latin Poems Commonly Attributed to Walter Mapes," *Camden Society Publications* (London, 1841); Pernwerth von Bärnstein, *Carmina Burana Selecta* (Würzburg, 1879).

GOL'IAS. See GOLIARDIC LITERATURE.

GOLI'ATH. A Philistine giant, born in Gath, and slain by an Israelitish hero. According to I. Sam. xvii. it was the youthful David who killed this giant, felling him with a stone from his sling, and cutting off his head with the fallen champion's sword. (See DAVID.) An older and more reliable tradition ascribes the deed to one of David's warriors, Elhanan, the son of Dodo (or Jair), of Bethlehem (II. Sam. xxi. 19; xxiii. 24). Probably the name of Elhanan's father and his home in Bethlehem facilitated the change. It is a common occurrence, however, that a famous king receives the credit for deeds done by his men. In I. Chron. xx. 4-8 Elhanan is said to have slain Lahmi, the brother of Goliath, and in the authorized version of II. Sam. xxi. 19 the Hebrew text is corrected to accord with this. The brother has probably been introduced to harmonize the two narratives.

GOLIATH BEETLE. Any of several huge cetonian beetles of the family Scarabæidæ, and genus Goliathus, specifically *Goliathus giganteus*, which is about four inches long by two inches wide. This species is West African, and according to Uhlet is subject to so much variation that several names have been given to its varieties. It is generally chalky white, with velvety black markings, prominently six black lines on the prothorax. They frequent the tops of forest trees, and are said to be fed on the sap. They are near allies of the Hercules beetles (q.v.).

GOLITZIN, or **GALITZIN**, gō-lits'in. A princely family of Russia, tracing its descent from Gedimin, Grand Prince of Lithuania, ancestor of the Jagellon Kings of Poland.—PRINCE MIKHAIL GOLITZIN was a celebrated military commander under Basil IV., Grand Prince of Moscow. He fought in the Crimea and in Lithuania, and in 1514 led an army against the Poles. He was defeated at Orsha and taken prisoner, remaining in captivity until 1552. He died in a convent at Moscow soon after his release.—VASILY VASILYEVITCH GOLITZIN, great-grandson of Mikhail, played an important rôle at the time of Boris Godunoff and the false Demetrius. He was sent as Ambassador to Poland with the offer of the Russian crown for Prince Ladislas, but was cast into prison by the Poles, and died in 1619.—BORIS ALEXEYEVITCH GOLITZIN (1641-c.1713) was the preceptor of Peter the Great and one of the regents of the Empire during Peter's travels abroad. He became subsequently Governor of Kazan and Astrakhan, and enjoyed great favor with the Czar.—VASILY VASILYEVITCH GOLITZIN, known as the Great (1613-1714), distinguished himself in military operations against the Cossacks of the Dnieper, gained the title of Ataman, and after 1680 was Minister of State. He was the lover of Sophia, sister of Peter the Great, who acted as regent during the young ruler's minority. As such, Golitzin was the virtual ruler of Russia, carrying on the government with great ability and firmness. He made the beginnings of military reform, thus preparing the way for the thorough organization of the army by Peter the Great. Upon the assumption of the Government by Peter in 1689, Vasily suffered disgrace and was banished to Siberia, where he died.—DMITRI GOLITZIN (died 1738) was Russian Ambassador to Turkey and Austria, and subsequently Superintendent of the Imperial Finances. He was one of the leaders of the aristocratic party which, upon the accession of Anna Ivanovna (q.v.), sought to impose a constitution upon the Empress by the terms of which the chief power would have been vested in the hands of a small faction of the nobility. The attempt, however, failed, and Dmitri died in prison at Schlüsselburg.—MIKHAIL GOLITZIN (1674-1730), brother of Vasily, entered the army at the age of twelve and early distinguished himself against the Turks. In 1700 he commanded a Russian corps, operating against the Swedes in Lithuania; in 1708 he gained the important victory of Lyesnaya, and in 1714 overran Finland, and was Governor of the country until 1721, in which year he conducted the negotiations leading to the Peace of Nystad. Golitzin was one of the greatest generals Russia has ever produced and a man of many abilities and admirable character. As Governor of Finland his conduct was marked by such justice and kindliness as to gain him, from a conquered population, the title of *Finskibog*, 'Godhead of the Finns.'—ALEXANDER MIKHAILOVITCH GOLITZIN (1718-83), son of Mikhail, after acting in the diplomatic service of Russia at Constantinople and Dresden, entered

the army and fought with distinction in the Seven Years' War. In 1769 he took Khotin from the Turks. He was subsequently Governor of Saint Petersburg and field marshal.—DMITRI ALEXEYEVITCH GOLITZIN (1735-1803) was a well-known diplomat and man of letters. From 1765 to 1773 he was Russian Ambassador at Paris, where he lived in close touch with Voltaire and other literary men of the time. In 1773 he became Ambassador at The Hague, whence, on the outbreak of the French Revolution, he retired to Germany, where he devoted himself to the study of the physical sciences. He wrote: *Description physique de la Tauride* (1788); *Traité de minéralogie* (1792); *L'esprit des économistes* (1796).—His wife, ADELHEID AMALIE (1748-1806), was a fervent Catholic. She made her home at Münster, and became the centre of a band of religious enthusiasts and mystics, whose efforts were directed toward counteracting the prevailing materialism of the age. Her son DMITRI was a Catholic missionary in the United States. See GALLITZIN, DMITRI.—ALEXANDER NIKOLAYEVITCH GOLITZIN (1774-1844) was one of the most influential counselors of Alexander I., together with whom he had been brought up. He became Procurator of the Holy Synod in 1803, and from 1817 to 1824 was Minister of Education and Public Worship. His liberal views aroused the opposition of the conservative element among the clergy, and with the accession of Nicholas I. he lost all influence.—EMANUEL MIKHAILOVITCH GOLITZIN (1804-53) was born in Paris, and studied at the Ecole Polytechnique under Gay-Lussac. He entered the Russian Army in 1825, and distinguished himself at the storming of Varna (1828), but retired from the army in the following year. He led a life of dilettante scholarship in the capitals of Western Europe, his chief interest lying in geography. He contributed to the *Bulletin de la Société de Géographie*, in Paris, and translated Ferdinand von Wrangel's *Voyage to Siberia* from the Russian. He also wrote *La Russie du 17ème siècle dans ses rapports avec l'Europe occidentale*, which was published two years after his death.—NIKOLAI SERGEYEVITCH GOLITZIN (1808-92) entered the army in 1825 and rose to be lieutenant-general. He wrote *A Military History of the World from the Most Ancient Times* (13 vols., 1872 et seq.).

GO'LIUS, gō'lē-ŭs, JACOBUS (1596-1667). A Dutch Orientalist and mathematician. He was born at The Hague, studied at Leyden, and there, in 1624, became professor of Arabic, and in 1629 professor of mathematics. He published a *Lexicon Arabico-Latinum* (1653), and numerous translations from the Arabic.

GOLLANCZ, gŏl'lăns, ISRAEL (1864—). An English scholar. He was born in London in 1864; was graduated from Christ's College, Cambridge (B.A., 1887; M.A., 1891), became lecturer in English at University College, London (1892-95), and has lectured in university extension courses and at Cambridge. Most of his published work has been in editing or in translating Old and Middle English texts, as the *Pearl* (1891); Cynewulf's *Christ* (1892); and the *Exeter Book* (1895). He is also editor of the *Temple Shakespeare* (1894-96).

GOL'OMYN'KA. See OIL-FISH; BAIKAL.

GOL'ONDRI'NA. The common green house-swallow (*Tachycineta leucorrhous*), abundant everywhere south of the Amazonian forests. It is closely related to the white-bellied tree-swallow of the United States, and like that and other species, has forsaken its native wildness and custom of nesting in hollow trees for intimate association with men, and nest-making beneath the eaves of buildings. It is richly green, with a white breast and rump. Many interesting things are related of it by Hudson, *Naturalist in La Plata* (London, 1892). See SWALLOW.

GOLOSHES, gō-lŏsh'ĕz (OF., Fr. *galoche*, probably from ML. *calopedia*, Gk. καλοπόδιον, *kalopodion*, clog, wooden shoe, diminutive of καλόπους, *kalopous*, καλάπους, *kalapous*, shoe-maker's last, from κᾶλον, *kalon*, wood + πούς, *pous*, foot). A term applied by the French at first to shoes partly of leather and wood, the soles being wood, and the uppers of leather. The term was introduced to this country as a cordwainer's technicality, to signify a method of repairing old boots and shoes by putting a narrow strip of leather above the sole so as to surround the lower part of the upper leather. It was also adopted by the patten and clog makers to distinguish what were also called French clogs from ordinary clogs and pattens. Clogs were mere soles of wood with straps across the instep to keep them on; pattens were the same, with iron rings to raise them from the ground; but the goloshes were wooden soles, usually with a joint at the part where the tread of the foot came, and with upper leathers like very low shoes.

By the term goloshes is now generally meant the india-rubber over-shoes which were introduced into Great Britain from America about the year 1847; but it was some time after this before the trade in them had reached much importance, as at first they were clumsily made, and of inferior quality. However, their quality and appearance were soon much improved, and the demand for them increased rapidly, but there are signs that the trade in these shoes is somewhat on the decline. See RUBBER.

GOLOVATSKY, gō'lō-văt'skē, JAKOV FEODOROVITCH (1814-88). A Russian scholar, born in Czepiele, Eastern Galicia. After study at Pest and Lemberg, he became professor of the Russian language and literature at the University of Lemberg in 1848. From 1867 he resided in Russia. His chief work is a collection of the folk-songs of the Russian peoples in Galicia, Hungary, and Bukowina, *Narodnyja pěsni Galickoj i Ugorskoj Rusi* (1878).

GOLOVNIN, gō-lŏv-nēn'. VASSILI MIKHAILOVITCH (1776-1831). A Russian sailor and explorer, born at Ryasan. He served in the English Navy against France, and on his return to Russia was put in command of the sloop *Diana*, to make a trip of exploration around the world. In 1811 he was captured in Japan and kept prisoner until 1813. A second trip around the world was made (1817-19) in the Russian corvette *Kamchatka*. His complete works, which contain descriptions of both voyages and of his adventures while in captivity, were published in five volumes at Saint Petersburg in 1864. Golovnin Bay and Golovnin Sound, in Bering Sea, are named for him.

GOLP, or **GOLPE**. A heraldic charge. See HERALDRY.

GOLTERMANN, gōl'tĕr-măn, GEORG EDUARD (1824-98). A German violoncellist and composer.

He was born at Hanover, and received his musical education under Prell, Menter, and Lachner. After completing his studies he traveled for two years giving concerts, in which he frequently performed his own highly successful compositions. In 1852 he received a position as musical director at Würzburg, and in the following year was appointed assistant conductor of the orchestra of the Stadttheater at Frankfort-on-the-Main, of which he became chief conductor in 1874. Besides a symphony (1851) and two *Festspiel-Overtures* (op. 24 and 94), his compositions include sonatas, songs, and numerous works for the violoncello.

GOLTZ, gōlts, August Friedrich Ferdinand, Count von der (1765-1832). A Prussian statesman, born at Dresden, and educated at Leipzig and Frankfort-on-the-Oder. He was Prussian Ambassador to Denmark, Sweden, and Russia; negotiated the Peace of Tilsit, was the Plenipotentiary of Prussia at the Congress of Erfurt (1808), and concluded the last negotiations (1812) with France. After the termination of the Napoleonic wars, he was appointed Prussian Councilor of State (1817).

GOLTZ, Bogumil (1801-70). A German humorist, satirist, and moral philosopher. He was born in Warsaw, attended the gymnasia at Marienwerder and Königsberg, studied agriculture from 1817 to 1821, and for a time attended philologic and philosophic lectures at the University of Breslau. In 1823 he purchased, near Thorn, an estate which he subsequently abandoned to settle in Gollub and devote himself to the study of literature and æsthetics. In 1847 he removed to Thorn, whence he made extensive travels, and where he died. In 1847 appeared his *Buch der Kindheit,* in which, with a mystic tenderness akin to that of Jean Paul, he depicts the impressions of his own childhood. This was followed by *Ein Jugendleben* (1851), in similar vein. *Der Mensch und die Leute* (1858) is a penetrative and peculiarly original study of various races, *Die Deutschen* (1860), revealing the same method applied to the German national genius. He was a profound thinker; but his style, though often spirited, lacks technical finish, and frequently displays the grotesqueness of Richter without the latter's imagination. His further works include: *Ein Kleinstädter in Aegypten* (1853); *Feigenblätter* (1861-64); *Die Bildung und die Gebildeten* (1864); and *Die Weltklugheit und die Lebensweisheit* (1869).

GOLTZ, Friedrich (1834-1902). A German physiologist, born at Posen. He studied at Königsberg, and was there appointed a professor in 1865. In 1870 he became professor of physiology at Halle, and from 1872 to his retirement in 1901 occupied a similar chair at Strassburg. His most important researches concern the functions of the nerve-centres, and in particular reflex nervous action. His writings include: *Beiträge zur Lehre von den Funktionen der Nervencentren des Frosches* (1869), and many contributions to the *Archiv für pathologische Anatomie, Physiologie und klinische Medizin* of Virchow.

GOLTZ, Kolmar, Baron von der (1843—). A German soldier and military author. He was born at Bielkenfeld, East Prussia, was educated at the Military Academy, Berlin, and served in the Austro-Prussian War of 1866. After the Franco-German War, in which he participated as an officer on the General Staff of the Second Army Corps, he was appointed to the historical department of the General Staff at Berlin, and subsequently became instructor in the Military Academy. He resigned from the German service in 1883, and entered that of Turkey, where he conducted the department of military education until 1896. In that year he returned to Germany, and was raised to the rank of lieutenant-general. His works on military history and tactics include: *Leon Gambetta und seine Armee* (1877; also translated into French, 1877); *Das Volk in Waffen* (4th ed. 1890); *Der thessalonische Krieg und die türkische Armee* (1898).

GOLTZ, Max, Freiherr von der (1838—). A German naval officer, born at Königsberg. He entered the Prussian marine in 1853, was appointed naval ensign in 1859, in 1870 was detailed for service in the Ministry of Marine, and in 1875 attained the rank of captain. During the disturbances in Egypt in 1882 he was commanding officer of Germany's Mediterranean squadron, in 1888 became vice-admiral and commander of the Wilhelmshaven Naval Station, and in 1895 was retired, with the rank of admiral, at his own request.

GOLTZ, Theodor, Baron von der (1836—). A German agriculturist, born at Coblenz, and educated at Erlangen and Bonn. In 1862 he was appointed instructor at the Royal Academy of Waldau, East Prussia, into which province he introduced the first agricultural schools. He was professor of agriculture at Königsberg from 1869 to 1875, when he was appointed director of the Agricultural Institute in that city. In 1885 he was made professor of agriculture at Jena. His publications include: *Die landwirtschaftliche Buchführung* (7th ed. 1892); *Landwirtschaftliche Taxationslehre* (2d ed. 1892); *Agrarische Aufgaben der Gegenwart* (2d ed. 1895); *Leitfaden der landwirtschaftlichen Betriebslehre* (1897); and *Vorlesungen über Agrarwesen und Agrarpolitik* (1899).

GOLTZIUS, gōl'tsī-ōōs, Hendrik (1558-1616). A Dutch engraver, born at Mühlbracht (the present Bracht). He was a pupil of Leonhard at Haarlem, where he later set up as a copper-plate printer. In his latter years he executed several paintings; but he is best known for his engravings, generally marked by an exceeding delicacy of line. His plates include: "The Annunciation" (after Raphael); "The Adoration of the Shepherds" (after Bassano); and "The Adoration of the Kings" (after Lucas van Leiden).

GOLUCHOWSKI, gōl'ōō-kōv'ski, Agenor, Count of (1812-75). An Austrian statesman, born in Galicia and educated at the Jesuit Convent of Tarnopol and at Lemberg. He entered Government service, and was Governor of Galicia from 1847 till 1859, when he was made Minister of the Interior. He gave up this position in 1860, and the next year entered the House of Lords. In 1866-67, and from 1871 until his death, he was again Governor of Galicia and very active in favoring the thorough Polonization of the province. His son Agenor (1849—) was in the diplomatic service from 1872 until 1895, when he became Minister of Foreign Affairs.

GOMARA, gō-mä'rä, Francisco Lopez de (1510-c.1559). A Spanish historian, born at Seville. He took orders, became professor of rhetoric at the University of Alcalá, and after-

wards was secretary and chaplain to Ferdinand Cortés. In this capacity he may have gone with him to America, but it is not probable. He wrote one of the first histories of America, which, however, is not reliable. The title of the work is *Historia general de las Indias con la conquista de México y de la Nueva España* (1552-53). The second part of this work described Mexico, and was reprinted as a separate volume, *Crónica de la Nueva España, con la conquista de México* . . . (1554).

GO'MARUS, FRANCIS (1563-1641). The most strenuous opponent of Arminius. He was born at Bruges, January 30, 1563, studied at Neustadt, Heidelberg, Oxford, and Cambridge, where he received the degree of B.D. in 1584. He was pastor of the Reformed Church at Frankfort from 1587 till 1594, when he became professor of theology at Leyden. Here he signalized himself by his vehement opposition to the views of Arminius, who became his colleague in 1603. In the disputation at The Hague in 1608 his zeal was very conspicuous; and at the Synod of Dort (1618-19) he was mainly instrumental in securing the expulsion of the Arminians from the Reformed Church. Gomarus resigned his professorship after the death of Arminius (1609). He was professor at Saumur, 1614-18, and at Groningen from 1618 till his death, January 11, 1641. Though prejudiced, even bigoted, and more Calvinistic than Calvin himself, nevertheless Gomarus was a man of learning, and not the contentious personage he is sometimes represented. His works were published at Amsterdam after his death (1645). Those who sided with Gomarus in the Arminian controversy are often called, from his name, 'Gomarists.' See ARMINIUS, JACOBUS; ARMINIANISM; DORT, SYNOD OF.

GOMBERVILLE, gôn'bâr'vêl', MARIN LE ROY, Seigneur de (1600-74). A French novelist of considerable imaginative originality, one of the first to make the novel a vehicle of exotic and geographic description and of historic information. He was born in Paris and was a wealthy nobleman, a cherished member of the Précieux blue-stocking circle, to whose vocabulary he contributed some gems, as may be seen from Somaise's *Dictionnaire des Précieuses.* While still a youth he wrote *Carithée* (1621), whose heroine furnished the type for Sorel's burlesque Dulcinea in the *Berger extravagant.* Eleven years later Gomberville published the first draught of *Polexandre* (1632), which he extended in 1634 by the injection of a story of Mexican adventure, and since this piqued curiosity, he again greatly extended the story in 1637. Meantime Gomberville had aided in founding the Academy. A few years later he fell under the influence of Port-Royal, and, in penitential regret for having amused a worldly generation, he published *Young Alcidiane* (1651). He was a facile polygraph, but *Polexandre,* which in its final shape contains 4409 closely printed pages, is his only significant work. It rejuvenated the interest in the romance of chivalry by transporting it to the New World in a generation whose imagination was intoxicated by strange voyages and undreamed-of conquests. The story is almost wantonly inartistic, but Gomberville is the first important pedagogue of fiction, bent on remolding the 'perfect lives' of the old romances into a model for the gentlemen of the seventeenth century. He died in Paris, June 14, 1674. Consult Körting, *Geschichte des französischen Romans im XVII. Jahrhundert,* vol. i., ch. 6 (2d ed., Oppeln, 1891).

GOM'BO. See HIBISCUS.

GOMBROON'. See BENDER ABBAS.

GOMEL, gō'mĕly'. A district town of the Russian Province of Mohilev, situated on a small affluent of the Dnieper, about 113 miles southeast of Mohilev. It lies on two railway lines, and has a number of sugar-refineries. The population, to a large extent Jewish, was 36,846 in 1897.

GO'MER. The form of powder-chamber generally used in smooth-bore guns. It was in the form of the frustum of a cone with a hemispherical end, the base of the cone joining the cylinder of the bore. The name is derived from that of its inventor.

GOMER. According to Gen. x. 2-3, the eldest son of Japheth (cf. Ezek. xxxviii. 6). The name corresponds to the Gimirrai frequently mentioned in the inscriptions of Assyrian kings, and whose seat was in Cappadocia in the seventh century B.C. It is likely that at an earlier period they were settled north of the Euxine Sea. By the help of the Assyrian inscriptions, the identity of Gomer with the Cimmerii of classical writers becomes certain. In company with the Medes and Minni the Gimirrai attacked the Assyrian frontier, but Esarhaddon defeated them at Khubushna in Cilicia, and drove them off. They then attacked the Ellipi, and were more successful. Lydia also was conquered by them, but they were finally driven out. Their hold on Cappadocia is still to be seen in the Armenian designation of the district as Gamir. Consult Rogers, *History of Babylonia and Assyria,* vol. ii. (New York, 1901).

GOMERA, gō-mā'rä. One of the Canary Islands, situated 17 miles west of Teneriffe, in about latitude 28° 6′ N., and longitude 17° 8′ W. Its area is nearly 145 square miles. It is of volcanic origin, like the whole archipelago. The coasts are little indented and present no good harbors. It is elevated in the interior to the extent of nearly 4000 feet, and has extensive forests of bay trees and palms. The chief industry is cattle-raising, though some silk and potatoes are exported. Population, in 1887, 14,140. The chief town, San Sebastián de Gomera, situated on the eastern coast, has a population of 2861.

GOMES, gō'mĕsh, ANTONIO CARLOS (1839-96). A Brazilian composer, born in Campinas. When still very young he went to Milan, and studied in the conservatory there under Lauro Rossi. His first opera, produced in Rio de Janeiro (1861), was *A noite do castello,* and was followed (1867) by *Se sa minga,* given in Milan with extraordinary success. His other operas were of uneven merit, and include: *Nella Luna* (1868); *Guarany* (1870); *Salvator Rosa* (1874); *Maria Tudor* (1877); *Lo Schiavo* (1889). In 1876 he wrote a hymn, "Il saluto del Bresile," for the Philadelphia Exposition, and in 1892 the cantata "Colombo," for the Columbian Exposition. He was appointed director of the Pará Conservatory in 1895, but died soon after accepting the position.

GOMES DE AMORIM, Francisco (1827-91). A Portuguese poet and dramatist, born at Avelomar (Minho). Early in his life he went to Brazil, where he was employed in a commercial enterprise, and studied the language and customs of the wild peoples in the primeval forests bordering the Amazon and the Xingu. In 1846 he returned to Portugal; in 1848 wrote "Garibaldi," "A liberdade," and other verses in celebration of that revolutionary year; and though at first compelled for support to learn the hatter's trade, obtained a post in the Government service in 1851, and in 1859 was appointed librarian to the Ministry of Marine and curator of the Museum of Naval Antiquities. In his literary career he was much encouraged by Almeida-Garrett (q.v.), whose *Camões* he read in Brazil, and in regard to whom he wrote the appreciative *Memorias biograficas* (1881), which is in fact a history of the literary movement represented by Garrett. The volumes of poems, *Cantos matutinos* (2d ed. 1866) and *Ephemeros* (2d ed. 1866), were followed by a series of dramas—*Odio de raça, A prohibição, Figados de tigre, Os incognitos do mundo, Ghigi, A viuva,* and others—many of which, like *O cedro vermelho* (with a commentary), are derived from Brazilian life. The works of fiction *Os selvagens* (1875), and its sequel, *O remorse vivo* (1876), have the same source. There is a collected edition of Gomes's works in Portuguese (Lisbon, 1866 et seq.), and several of the dramas have been rendered into French by Richon and Denis. Consult Reinhardstoettner, *Aufsätze und Abhandlungen* (Berlin, 1887).

GOMEZ, gō'mâs, Antonio. See Orsini, Felice.

GOMEZ, Estevan (c.1474-c.1530). A Portuguese navigator. In 1519 he started from Spain with Magellan, as pilot on the *Trinidad,* of which vessel Magellan himself acted as captain; but in the Strait of Magellan he commanded a successful mutiny on the *San Antonio,* to which vessel he had been transferred, and, leaving the rest of the fleet, returned to Spain. In 1524-25 he seems to have made a voyage to North America, and to have coasted from Labrador to Florida in an effort to discover for Charles V. a western passage to the Moluccas. Confirmation of the voyage is furnished by the fact that on the map of Diego Ribeiro, made in 1529, that part of the continent between the present States of New Jersey and Rhode Island is put down as the 'Tierra de Gomez.'

GOMEZ-FARIAS, gō'mâs fä-rē'âs, Valentin (1781-1858). A Mexican statesman. He was born and educated at Guadalajara, where he received a professorship in the university in 1810. He was a pronounced Liberal in the First Constituent Congress, became Vice-President upon the election of Santa Anna, and assumed the reins of government upon the absence of the latter, April 1, 1833. In consequence of his pronounced antagonism to the Church party, he was, after a constant struggle of two years against continuous opposition, compelled to resign in 1835, and exiled. Although received by the masses with general acclamation upon his return, his political influence aroused the fears of the party in power, and after suffering imprisonment and vainly endeavoring to foment a revolution, he was again banished. He was again Vice-President at the time of the war with the United States, when Santa Anna was compelled to take the field. After the abolition of the Vice-Presidential office, he became a member of Congress. He later took an active part in overthrowing the dictatorship of Santa Anna, and became Postmaster-General under his successor Alvarez.

GOMEZ Y BAEZ, Máximo (1826—). A Cuban general, born at Bani, Santo Domingo. He served in the Spanish Army in Santo Domingo and in Cuba; but in Cuba he became disgusted with Spanish rule, and especially with the dishonesty and cruelty of Villar, who was in command of the Spanish forces, and whom Gomez personally assaulted. He left the Spanish Army, settled down as a planter, and in the insurrection of 1868-78 joined the insurgents, and was made colonel by the Cuban President Céspedes. He was active and able; and after Agramonte's death was put in command of the insurgents in Camaguey. When peace was signed with Campos in 1878, Gomez went to Jamaica and then to Santo Domingo, where he lived on his farm until 1895, when the second revolution broke out. He became general-in-chief of the forces of the Republic of Cuba, and was especially active in Camaguey, where his perfect familiarity with the country stood him in good stead. He did little open fighting, but accomplished much by harassing the Spaniards and destroying their supplies. He put his small force at the disposal of the Americans as soon as they landed in Cuba, and was markedly friendly to this country. In March, 1899, he was deposed from his supreme command by the Cuban Assembly for traitorously receiving for his army the three millions of dollars voted by the United States Government. Among his sketches of warfare in Cuba are: *Panchito Gomez* and *Mi Escolta* (1896). Consult Carrillo, *In the Saddle with Gomez* (New York, 1898).

GOM'ME, George Laurence (1853—). An English antiquary and folklorist, born in London. He became statistical officer and later clerk to the London County Council, was the founder of the Folklore Society, an organization that has done important work in the preservation of records of the rural customs of England. Of this society he was elected successively secretary, president, and vice-president. He was also appointed a lecturer in the London School of Economics, and edited the *Archæological Review,* the *Folklore Journal,* and the *Antiquary.* His publications include: *Primitive Folk-Moots* (1880); *Folklore Relics of Early Village Life* (1883); *The Village Community* (1889); *Ethnology in Folklore* (1892); and *Lectures on the Principles of Local Government* (1898).

GOMOR'RAH. See Sodom and Gomorrah.

GOM'PERS, Samuel (1850—). An American labor leader, born in London, England. Apprenticed to the trade of cigar-making, he came to the United States in 1863, and in 1864 became the first registered member of the Cigar-Makers' International Union, of which he was secretary and president, and which he made one of the most successful of American trade unions. He was elected vice-president of the Federation in 1881, and from 1882, with the exception of the year 1894, when he was defeated by John McBride, representing the coal-miners, was its president. Among the State and Federal laws

passed at his instance are the eight-hour law for Government work, the ten-hour law for the employees of street railways, and that making the first Monday of September a legal holiday with the title of 'Labor Day.' His writings include pamphlets on labor matters.

GOMPERZ, gŏm′pērts, THEODOR (1832—). An Austrian Hellenist. He was born at Brünn, and studied at the University of Vienna, where he became professor of classical philology in 1869. He is celebrated chiefly for his decipherment of the papyri found at Herculaneum. His best known works are: *Demosthenes der Staatsmann* (1864); *Philodemi de Ira Liber* (1864); *Herculanische Studien* (2 vols., 1865-66); *Die Bruchstucke der griechischen Tragiker und Cobets neueste kritische Manier* (1878); *Herodoteische Studien* (1883); *Zu Philodems Buchern von der Musik* (1885); and his masterpiece, *Griechische Denker, eine Geschichte der antiken Philosophie* (1893-95). He also edited the German edition of the works of John Stuart Mill (1869-80).

GOMPHOCERAS, gŏm-fŏs′ē-ras (Neo-Lat., from Gk. *γόμφος, gomphos,* nail, bolt + *κέρας, keras,* horn). A genus of tetrabranchiate cephalopods, allied to Orthoceras, and found in the Paleozoic rocks, with short, thick, straight, or curved shells, and restricted lobate aperture. The siphuncle is situated near the ventral wall, and is usually beaded. The shell, when curved, turns away from the ventral side. Gomphoceras presents variations that grade toward Phragmoceras, of which it perhaps presents, in a loose sense, an ancestral stage. About one hundred and fifty species of Gomphoceras have been described from rocks of Ordovician and Silurian age of Europe and North America. They are especially abundant in the Silurian basin of Bohemia. See CEPHALOPODA; ORTHOCERAS; NAUTILUS.

GOMPHO′SIS (Neo-Lat., from Gk. *γόμφωσις,* a nailing together, from *γομφοῦν, gomphoun,* to nail, from *γόμφος, gomphos,* nail, bolt). A joint in which one bone is implanted into a process in another bone, as in the case of the teeth, implanted into the alveolar processes of the jaw.

GOMUTI, gō-mōō′tĭ (Malay), ARENG, or EJOO PALM (*Arenga saccharifera*). An important palm which grows in dry ground in Cochin China and in the interior of Java, Sumatra, Celebes, and Amboyna. The stem is 20 to 40 feet high; the pinnated leaves 15 to 25 feet long. The flowers, in bunches 6 to 10 feet long, are succeeded by yellowish-brown, three-seeded, extremely acid berries of the size of a small apple. The stem, when young, is entirely covered with sheaths of fallen leaves, and black horsehair-like fibres, which issue in great abundance from their margins; but as the tree increases in age, these drop off, leaving a beautiful naked columnar stem. The strongest of the fibres, resembling porcupine quills in thickness, are used by the Malays as styles for writing on the leaves of other palms. The finer fibres, or Ejoo fibre, well known in Eastern commerce as gomuti, are by far the most valuable. They are much used for making strong cordage, particularly for the cables and standing rigging of ships, European as well as native. Want of pliancy renders them less fit for running-rigging, and for many other purposes. They need no preparation but spinning or twisting. No ropes of vegetable fibre withstand wet as well as those made of gomuti fibre. At the base of the leaves of the gomuti palm there is a fine woolly material, called 'bara,' much employed in calking ships and stuffing cushions. The saccharine sap, obtained in great abundance by cutting the spadices of the flowers, is boiled by the Japanese to make a brown sugar. It is also a delicious beverage, and by fermentation yields an intoxicating wine (neroo), from which a spirituous liquor called 'brum' is made. According to Roxburgh, the pith of the tree yields sago, as much as 150 pounds being taken from a single specimen. After fruiting, the tree dies, and the stems, which become hollow, are used for troughs, spouts, etc. The young fruits are employed for making preserves.

GONAÏVES, gō′nä′ēv′. A seaport town of Haiti, with an excellent harbor, situated on the western coast, about 67 miles northwest of Port-au-Prince (Map: West Indies, L 5). It is a prosperous place, with a large trade in cotton, coffee, and logwood. It is purely Haitian in its character, and has played a prominent part in the history of Haiti. Its population is estimated at 18,000. Gonaïves is the seat of a United States consul.

GONAQUAS, gō-nä′kwäz. A mixed Hottentot-Kaffir people of Cape Colony. See GRIQUAS.

GONCOURT, gōn′kōōr′, EDMOND DE (1822-96), and JULES DE (1830-70). Brothers, important in the development of French fiction. They fostered naturalism by the minuteness of their observation, and so continued the naturalistic method of Flaubert, and regarded themselves as masters of a school in which Zola was the most brilliant pupil; while on the other hand in the tortured artificiality of their style they presage the painful striving of the symbolists (q.v.) to express feeling and emotion by sound. Their intensely modern style, often bizarre, sometimes intentionally faulty, always supple, clear, rapid, made all their contemporary novelists in some degree their debtors, while it estranged the general public. Their work consists of unimportant dramas, of minute and valuable studies in the social life of the French eighteenth century: *Histoire de la société française pendant la révolution* (1854); *Histoire de la société française pendant le directoire* (1855); *La révolution dans les mœurs* (1854); *Portraits intimes du XVIIIème siècle* (1856-58); *Marie Antoinette* (1858); *Les maîtresses de Louis XV.* (1860-79); *La femme au XVIIIème siècle* (1862); *L'art au XVIIIème siècle* (1874); *L'amour au XVIIIème siècle* (1877); to which Edmond added historical studies of *Watteau* (1876), *Prud'hon* (1877), and *Les actrices au XVIIIème siècle* (1885-90); of articles that first directed French attention to Japanese art; and, finally, of novels: *Charles Demailly* (1860); *Sœur Philomène* (1861); *Renée Mauperin* (1864); *Germinie Lacerteux* (1865); *Manette Salomon* (1867); *Madame Gervaisais* (1869); to which Edmond added: *La fille Elisa* (1878); *Les frères Zemganno* (1879); *La Faustin* (1882); *Chérie* (1884). All these are minutely realistic. They seek to present nature unadorned and unarranged, discarding all conventions of structure and artistic unity, thus "sterilizing their human documents" (Zola). Their observation, however, is apt to be super-

ficial, external, and, by preference, morbid. *Germinie Lacerteux* is to be 'the clinic of love,' and *La fille Elisa* pushes to its utmost paradox the divorce between fiction and conventionality. It is not as story-tellers that the Goncourts interest us, but as stylists. Their ability to reproduce a series of sensations by a series of images, their 'notation of indescribable sensations,' their skill in startling with the aptness of their epithets, in 'pinning their adjectives,' is what most attracts. They chose to live for their art alone and for the choice spirits that could comprehend them, for whose permanent association and fostering Edmond left the larger part of his fortune to endow an Academy of the Goncourts. Consult: Delzant, *Les Goncourts* (Paris, 1889); Zola, *Les romanciers naturalistes* (ib., 1881); Bourget, *Nouveaux essais* (ib., 1885); Brunetière, *Le roman naturaliste* (ib., 1896); Wells, *A Century of French Fiction* (New York, 1898).

GON'DAR. The former capital of Abyssinia, in Amhara, situated about 25 miles north of Lake Tsana (Map: Africa, H 3). It lies on an isolated hill in a spur of the Wogara Mountains, at an altitude of over 6000 feet. It is poorly built, with crooked, narrow streets, and is divided into several parts, which are located at some distance from each other. In former times Gondar had a large number of churches. Near by is the ruined fort of Gip, constructed by the Portuguese. The palace is a fine example of Abyssinian architecture. The town is in a state of decay, the Mohammedan quarter being entirely deserted. The inhabitants, once estimated at 50,000, now number about 5000, of whom a considerable number are priests. Gondar is on the route of the partly constructed railway line from Massowah (q.v.). There are many skilled artisans here, who produce gold ornaments and textiles. Gondar is the seat of the Abuna, the head of the Abyssinian Church, and has several ecclesiastical schools. Its decline dates from the reign of Theodore II., whose hostile attitude toward the Mohammedans caused a great decrease in the population.

GONDI, or **GONDY**, gôn'dê', Jean François Paul de. See Retz.

GON'DIBERT. A religious epic in elegiac stanzas by Sir William Davenant, begun late in 1649, in Paris, and finished during imprisonment in the London Tower. It was published in 1651, the first edition being in three books of six, eight, and six cantos respectively, although in a letter to Hobbes the author had defined his original aim as affecting analogy to dramatic form, "proportioning five books to five acts, and cantos to scenes."

GONDOKORO, gôn'dô-kō'rô, or **ISMAILIA**, ēz'mâ-ē'lê-â. A small settlement in Central Africa, situated on the Upper Nile, in latitude 4° 55′ N. (Map: Congo Free State, F 2). It was formerly an important trading centre for ivory and slaves. Its commerce began to decline after its annexation to Egypt in 1871. Gondokoro figures prominently in the history of the explorations of Africa.

GON'DOLA (It.). The ordinary passenger boat used in the canals of Venice. It was formerly the only means of getting about the city, but it is now being displaced in part by small launches operating upon the plan of an omnibus. An ordinary gondola is 30 feet long and 4 or 5 feet wide, and is flat-bottomed, so that the draught is light. The bottom rises slightly above water at the ends, while at the bow and stern slender ornamental stem and stern pieces reach to about the height of a man's breast. The stem piece is surmounted by the *ferro*, a bright iron beak of uniform shape, the *rostrique tridentibus* of Vergil common to old Roman galleys. There is a covered shelter for passengers in the middle of the boat, which is easily removable. In accordance with a mediæval regulation, gondolas are painted black. The gondolier stands erect, with his face toward the bow, and propels the boat with a forward stroke, making his way through the narrow and often crowded canals with amazing dexterity.

GONDOLIERS, gŏn'dô-lērz', The. The title of one of the later operas by Gilbert and Sullivan. Its production was followed by a rupture in the relations of the author and the composer, which was later temporarily healed.

GONDS. An important Dravidian people, inhabiting mainly the Central Provinces of India, but found also in other sections of the country, and numbering about 1,500,000. The wilder and uncivilized tribes of the Gonds, who inhabit the forested hills of the Vindhya and Satpura ranges, preserve more of the primitive Dravidian physical type, social institutions, religious and mythological beliefs and practices than do those whose culture is more advanced, who have to a considerable extent adopted Hinduism, and with whom the higher classes are more or less mixed with Hindu blood. The Gonds are said to have formerly offered up human sacrifices to some of their deities, but now they sacrifice instead an image of straw. The Gond women have a curious festival, called the Gurturna ('sugar-breaking'), in which the men figure to some disadvantage. It often ends in a saturnalia. Among the Gonds the worship of such plagues as smallpox, cholera, etc., prevails, and many of them reverence the dog, the horse, and the tiger to an extraordinary degree. The Gonds are to a large extent monogamous, and have many curious marriage and premarital customs. The Gonds are not to be confounded with the Khonds, another Dravidian people to the east of them. Besides the earlier works of Campbell, *Wild Tribes of Khondistan* (London, 1863), and Hislop, *Aboriginal Tribes of the Central Provinces* (Nagpur, 1866), reference may be made to Forsyth, *Highlands of Central India* (3d ed., London, 1889).

GONDWANA, gŭnd-wâ'nâ (the land of the Gonds). A name vaguely applied to a hilly tract in Central India, lying between latitudes 18° and 24° 30′ N. (Map: India, C 4). Most of the region is included in the Central Provinces.

GON'ERIL. The more wolfish of the unnatural daughters of King Lear, in Shakespeare's tragedy of that name. She is the wife of the Duke of Albany.

GON'FALON (archaic *gonfanon*, OF. *gonfanon*, Fr. *gonfalon*, from ML. *gonfano*, *gunfano*, banner, from OHG. *gundfano*, battle-flag, from *gund*, battle + *fano*, *vano*, Ger. *Fahne*, flag). The ensign or standard, indicative of authority, which was carried before, and sometimes by, the chief magistrate (hence called gonfaloniere) of many of the Italian cities in the latter part of the Middle Ages.

GONG. See TAM-TAM.

GÓNGORA Y ARGOTE, gōn'gō-rä ē är-gō'tä, LUIS DE (1561-1627). A Spanish poet, born at Cordova. He studied law at the University of Salamanca, and there composed the greater part of his erotic poems, romances, and satires. At the age of forty-five he took orders, obtained a small prebend in the Cathedral of Cordova, and was afterwards appointed honorary chaplain to Philip III. Góngora's poetic career divides itself into two periods. In his first or youthful period, he yielded himself up entirely to the natural tendencies of his genius and to the spirit of the nation. His lyrics of this period are *villancicos, letrillas,* romances, and sonnets in the old genuine Spanish style, and, as regards their caustic satire and burlesque wit, are among the most admirable specimens of the class of poems to which they belong. Góngora, however, wished to outdo all his predecessors, and to furnish something wholly new and unheard of; and the result of this unfortunate ambition was the introduction of a new poetic phraseology, called the *estilo culto,* or the 'cultivated style.' From this point the second period in Góngora's literary career dates. To popularize the *estilo culto,* he wrote his *Polifemo, Soledades,* and the *Piramo y Tisbe*—productions of the most pedantic and tasteless description, poor in invention and thought, but rich in high-sounding, pompous phrases, and overloaded with absurd imagery and mythological allusions, expressed in language of studied obscurity. In this way he became the founder of a new school, the *Gongoristas,* or *Cultoristas,* who even surpassed their master in the depravity of their literary tastes. The baneful influence of Góngorism, a style quite like that of Euphuism in England and that of Marinism in Italy and France, continued down through the eighteenth century. None of Góngora's poems were printed during his lifetime; but in 1627, immediately after his death, they were published at Madrid by his friend Vicuña, as the *Obras en verso del Homero Español.* Some additions are found in the later editions of 1633, 1654, and 1659, as well as in the edition of 1636-49, for which Saliedo Coronel prepared a commentary, made necessary by the studied obscurity of Góngora's style. He died at Cordova. A critical edition of the poet's work is still a desideratum, for the selection given in volume xxxii. of the *Biblioteca de autores españoles* is very unsatisfactory as to text. Consult also: The *Poesías escogidas de Góngora, con varias inéditas* (Madrid, 1863), and the poems given in Quintana, *Poesías selectas,* vol. iii. (Madrid, 1807), and in Maury, *Espagne poétique* (Paris, 1826). Rennert has published forty-nine unedited poems of Góngora in the *Revue Hispanique,* vol. iv. (Paris, 1897). Consult: Churton, *Góngora: An Historical and Critical Essay, with Translations* (London, 1862); and Mrs. Shelley, *Lives of the Most Eminent Literary and Scientific Men,* vol. iii. (London, 1835).

GONIATITES, gō'nī-ä-tī'tēz (Neo-Lat., for **Gonialites,* from Gk. γωνία, *gōnia,* angle + λίθος, *lithos,* stone, in allusion to the angulate sutures). An extinct tetrabranchiate cephalopod, the shell of which resembles that of the Ammonoidea in form, but differs from it in having a simple suture line that shows undulating or zigzag curves without secondary crimping. The Goniatites have smooth unornamented shells of discoid or globular form, with open or closed umbilicus. They vary in size from 1 to 4 inches, though some species from the Devonian system attain a diameter of over 12 inches. The name Goniatites has long been used in a generic sense; but the group has proved to be heterogeneous, and the species have been redistributed among a number of new genera and four new suborders, the Microcampyli, Mesocampyli, Eurycampyli, and Glossocampyli, these names referring to the form of the saddles of the sutures in the types of the different groups. The old genus Goniatites was considered to be an intermediate form between the Nautiloidea and the Ammonoidea, and the above-mentioned suborders represent, in a broad way, transition groups between certain races of nautiloids and certain races of ammonoids.

The species of Goniatites appear first in the lowest Devonian rocks, and they disappear in the Triassic system; their period of maximum development was during Upper Devonian and Lower Carboniferous time. They are thus index fossils of the Upper Paleozoic age. They are found in Europe, Asia, Australia, and North America, often in such abundance that the beds containing them have received the names of Clymerien-kalk and Goniatites limestone. See AMMONOIDEA and CEPHALOPODA, and the bibliography given under the latter title.

GONID'IA (Neo-Lat. nom. pl., from Gk. γονή, *gonē,* seed). The algal cells of a lichen. Also applied by some botanists to the asexual spores of algæ and fungi, and including the well-known conidia of those groups. See LICHEN.

GO'NIOM'ETER (from Gk. γωνία, *gōnia,* angle + μέτρον, *metron,* measure). In mineralogy, an instrument used to measure the angles of crystals. The simplest form is the contact goniometer, which consists of a pair of arms which move about a pivot like a pair of shears, and can be clamped in any position and connected with a protractor for the reading of angles. The *reflecting goniometer* makes use of a beam of light reflected successively into a telescope from different faces of a crystal as the crystal is revolved upon a single axis. The direct readings of this instrument give by their numerical difference the supplement of the angle desired. The most modern type of goniometer is constructed on the principle of the theodolite, and measures angles in two planes at right angles to each other. This is known as the *theodolite goniometer,* or *two-circle goniometer,* and its introduction has not only extended the possibilities of measurement, but greatly simplified the calculation of crystal forms. See CRYSTALLOGRAPHY.

GO'NIOM'ETRY. A branch of trigonometry concerned with the functions of angles in general and with their relations. See TRIGONOMETRY; GONIOMETER.

GÖNNER, gēn'nēr, NIKOLAUS THADDÄUS VON (1764-1827). A German jurist, statesman, and author. He was born at Bamberg, where he was appointed to the chair of law (1789). Ten years afterwards he accepted a similar position at Ingolstadt, where he exercised a most beneficial influence upon the development of the university, which, by his suggestion, was subsequently removed to Landshut. From 1811 until

shortly before his death he held many judiciary offices at Munich, where he was appointed Counselor of State in 1820. His principal works include: *Handbuch des deutschen gemeinen Prozesses* (2d ed., 4 vols., 1804), and *Deutsches Staatsrecht* (1804).

GO'NOCOC'CUS. See GONORRHŒA.

GONORRHŒ'A (Lat., from Gk. γονόρροια, *gonorrhoia*, from γόνος, *gonos*, semen + ῥοιά, *rhoia*, a flow, from ῥεῖν, *rhein*, to flow). A name which was formerly applied almost indiscriminately to all discharges from the genital passages in both sexes. At present the name is applied to a specific catarrhal, inflammatory disease of the mucous membrane of the urethra, caused by a germ, *Gonococcus gonorrhœæ*, which was discovered by Neisser. The disease is never caused by 'taking cold,' or a 'strain,' by mere uncleanliness, or injury. The access to the urethra of mucus or pus containing the gonococcus occurs, in the vast majority of cases, during sexual intercourse. From two to ten days after the sexual intercourse, a slight watery discharge appears at the mouth of the urethra, the lips of which become red and swollen. The discharge quickly becomes abundant and white, later yellowish, possibly greenish or bloody. Itching follows, with burning pain, especially on urination, which becomes frequent. In the male, painful erections of the penis occur, principally at night, during which the organ is curved. This condition is called *chordee*. Without treatment, gonorrhœa invariably becomes chronic and permanent. Disease of deeper parts often follows, and the bladder, prostate gland, seminal vesicles, and neighboring lymphatics become infected. General infection is frequently followed by 'gonorrhœal rheumatism,' which is an arthritis, or joint disease, with stiffness and pain, caused by the toxins which are formed by the disease germs. It is extremely difficult to treat the disease when it invades the prostate gland or the seminal vesicles. In a woman, the vagina, bladder, uterus, Fallopian tubes, and ovaries may be attacked. If the vagina be infected, there may be swelling, heat, pain, and great scalding from the urine. In many cases, however, the patient may not know she has the disease till uterus and tubes are attacked, noticing only an increase of fluid escaping from the vulva, and thinking she has a simple catarrhal, instead of a specific discharge.

From three to five days after contracting the disease, most patients suffer from fever, headache, slight nausea, possibly preceded by a chill. During this stage the patient should be in bed, on low diet, and should take a cathartic, and drink large quantities of plain water. All treatment should be directed by a physician. Injections taken too early or in too concentrated a form may drive the infected mucus deeper, or weaken the resistive power of the urethra, or cause buboes. Injections of solutions of protargol, mercurol, nitrate of silver, permanganate of potash, sulphate of zinc, etc., are used. Irrigations with bichloride of mercury are sometimes used. Internally, cubebs, copaiba, salol, oil of sandal, cystogen, sour palmetto, and many other drugs are used. All alcoholic beverages must be absolutely prohibited, and all sexual intercourse positively stopped, till two weeks after the patient is cured. The disease is not at an end when the discharge stops, unless the urine is perfectly clear, and the mucus from the prostate gland as well as the seminal fluid contain no gonococci discoverable by the microscope. Infection of a wife may occur when there is discharge from the disease, if the germs lurk in the seminal vesicles. Extreme care should be taken by one suffering with gonorrhœa to catch the discharge in gauze, which should be burned. If the fingers be soiled with the discharge the eyes may become infected, and blindness may result. The testicles should be supported by a snug suspensory bandage. Patent medicines should be shunned. If gonorrhœa persist for a considerable time and the discharge become thin and scanty, the term 'gleet' is applied to it by some.

The *Gonococcus*, or *Micrococcus, gonorrhœæ* is an extremely minute organism. It occurs usually in pairs, with flattened sides lying in apposition. For this reason it is often referred to as the *Diplococcus gonorrhœæ*. It is not easily grown on the more common culture media, but grows readily on human blood-serum, with or without agar, at the temperature of the body. The mucous membranes of the lower animals do not seem susceptible to gonorrhœal infection, but the human urethra reacts promptly to inoculation with pure cultures. In the mucous membrane it sets up an exudative inflammation, and may be found either free in the exudate or inclosed in the cast-off epithelial cells. Its presence within the cell bodies, taken in connection with its occurrence in pairs, and its behavior when subjected to a special stain known as Gram's stain, make its identification usually possible. Quite frequently the pus-producing organisms are associated with the gonococcus. It is believed that gonorrhœal infection from the vagina of the mother during parturition is responsible for *ophthalmia neonatorum*, an intense form of conjunctivitis, which often results in blindness through the destruction of one or both eyes.

GONORRHŒAL OPHTHAL'MIA. See CONJUNCTIVITIS.

GONSALVO DE CÓRDOVA, gôn-thäl'bô dâ kôr'dô-bä (GONZALO HERNANDEZ Y AGUILAR). A celebrated Spanish commander. He was born at Montilla, near Cordova, in 1453 (according to some in 1443). He distinguished himself in the war waged by Queen Isabella of Castile against Portugal and in the war against the Moors, and was charged in 1491 with the conduct of the negotiations for the surrender of Granada. In 1495 he was sent by Ferdinand of Aragon to the assistance of Ferdinand, King of Naples, against the French. In less than a year, Gonsalvo, with his limited resources, had delivered the greater part of the kingdom, and obtained the appellation of 'El Gran Capitán.' In 1498 he returned to Spain and was received with signal marks of distinction by the King. Having been placed in command of a fleet in the Mediterranean, he took Cephalonia from the Turks at the beginning of 1501 and restored it to Venice. When the partition of the Kingdom of Naples was determined upon by a compact between Louis XII. of France and Ferdinand the Catholic, entered into at Granada in 1500, Gonsalvo de Córdova led the invading Spanish army. The conquest of the kingdom was speedily achieved, but the conquerors soon quarreled over the partition of the booty, and war broke out between them in 1502. Gonsalvo de Córdova

vanquished the French at Cerignola, April 28, 1503, took possession of Calabria, the Abruzzi, Apulia, and the city of Naples itself, and then laid siege to Gaeta, but was compelled to retreat before a superior force of the enemy. On December 27th of the same year, however, he fell upon them unexpectedly near the Garigliano, and obtained a complete victory. The French army was almost annihilated, the fortress of Gaeta fell, and the possession of Naples was secured to the Spaniards. King Ferdinand bestowed the Duchy of Sesa upon the conqueror, and appointed him viceroy of Naples with unlimited authority. His good fortune, however, made him many powerful enemies, and his popularity with the Neapolitans awoke the King's jealousy. Gonsalvo was recalled to Spain, where the King treated him with marked neglect. He now betook himself to his estates in Granada; but after the defeat of the new viceroy in Naples by Gaston de Foix, he was again appointed to the command of the Spanish army in Italy. Mental suffering, however, had undermined his health, and on December 2, 1515, he died at Granada.

GONTARD, gōn'tärt, KARL VON (1731-91). A German architect, born at Mannheim. He studied under Semper and Richter at Bayreuth, and the eminent architect François Blondel at Paris. Afterwards he became a favorite with Frederick the Great, who intrusted him with several architectural commissions. His structures include the two beautiful church towers, designed in the style of Louis XVI. (Gendarmenmarkt, Berlin); the colonnades of several fine bridges at Berlin; and the marble palace at Potsdam, completed by Langhans.

GONTAULT, gōn'tô', CHARLES DE. See BIRON, CHARLES DE GONTAULT, Duc de.

GONTCHAROFF, gōn'chä-rôf', IVAN ALEXANDROVITCH (1812-91). A Russian novelist. He was born at Simbiesk, of a very wealthy family. At ten he was sent to school at Moscow, and visited his native place only during vacations. In 1831-34 he finished his philological studies at the university, spent a year at his native town, and in 1835 accepted a position in the Ministry of Finance. His transformation from romanticism to realism was embodied in his *A Common Story* (1847), which had a great success. In 1856-57 he published the *Frigate Pallas*, a collection of letters describing his two and one-half years' journey around the world in the capacity of secretary to Admiral Putyatin, who had been sent to Japan to conclude a commercial treaty. In 1858 he wrote *Oblomoff*, and a little later was appointed to a position in the Department of Censorship; then he became editor of the official organ, the *Northern Post*, and retired in 1873 with a pension. In 1868 his *Precipice* appeared in the *Messenger of Europe*, and greatly aroused the public and critics by the caricature of Young Russia in the dissolute Volokhoff. His later short sketches and critical essays, the most striking of which is *A Million Tortures*—a powerful analysis of *The Misfortune of Being Too Clever* by Griboyedoff (q.v.)—added little to the fame of the author of *Oblomoff*. *Oblomovism*, or *Oblomovshtina*, has become a byword for the pan-Russian inertia which renders the hero incapable of any action. The power of generalization reached here by the author surpasses everything of the kind in Russian literature. Gontcharoff's work *The Precipice* has been published in German, under the title *Der Absturz*, in Reclam's *Universalbibliothek*.

GON'VILLE AND CAIUS (kēz) **COLLEGE.** A college of Cambridge University, which is usually called Caius College. It was founded in 1348 by Edmund Gonville, sometime Vicar-General of the Diocese of Ely; but the sudden death of the founder and the insufficient provision for support of the scholars led Gonville's executor, William Bateman, Bishop of Norwich, to remodel the statutes, rechristen the house as the College of the Annunciation, and divert the students to the special study of theology and canon and civil law. Soon after, the college was moved from its original site to the place it now occupies. It was then of little importance, and seems to have consisted only of a master and three or four fellows. In 1558 Dr. John Caius, who was physician to the Court, refounded the college, altering the name to its present form; added much to the college buildings, as well as to the endowment; and became master of the college, which office he held till his death in 1573. Owing to his influence, the college has since been famous for its attention to medical studies, and some of the greatest of English physicians have been among its members, of whom Harvey, the discoverer of the method of the circulation of the blood, is the most distinguished. Gonville and Caius College consists of a master and twenty-two fellows. It has thirty-six scholarships and exhibitions, besides several studentships in medicine and natural science. Among its great names are those of Sir Thomas Gresham, Jan Gruter, Jeremy Taylor, and Lord Chancellor Thurlow.

GONZAGA, gôn-zä'gä, HOUSE OF. A princely Italian family whose members for a number of centuries ruled over Mantua and Montferrat. It claimed descent from the German Emperor Lothair. The rule of the Gonzaga in Mantua was established in 1328 by the final defeat of the Bonacossi family and the murder of their chief, Passerino de' Bonacossi. In 1433 the captaincy was changed to a marquisate, and in 1530 to a dukedom. In 1536 the Gonzaga became marquises of Montferrat, in 1539 they acquired the Duchy of Guastalla, and in 1565 that of Nevers. Other important possessions of the family at various times were the duchies of Solferino, Rethel, and Sabbionetta, the Principality of Bozzolo, the Marquisate of Medola, the countships of Torelli and Novellara, and the Principality of Castiglione. The members of the House of Gonzaga were the faithful champions of Imperial interests in Italy, and waged war with the Visconti, dukes of Milan. They produced many men who became famous soldiers, statesmen, churchmen, and patrons of art and letters. The most illustrious of these were: GIOVANNI FRANCESCO (died 1444), in whose favor Mantua was created a marquisate by the Emperor Sigismund, in return for services to the Empire.—GIOVANNI FRANCESCO II. (reigned 1484-1519), who was defeated by Charles VIII. of France at the battle of Fornovo, on the banks of the Taro, in 1495, and who took part in the engagement of Atella (1496), which led to the capitulation of the French forces in Naples. His son, FEDERIGO II. (reigned 1519-40), was invested by the Emperor Charles V. with the ducal dignity in 1530, and

also obtained the Marquisate of Montferrat in 1536. During the reign of this prince the Court of Mantua was one of the most magnificent in Europe.—GUGLIELMO (1550-87), son of Federigo, proved a wise and enlightened ruler; his secretary was Bernardo Tasso, father of the poet.—VICENZO (1587-1612), son of Guglielmo, was the warm friend and patron of Tasso, and was much esteemed for his piety, justice, and liberality. His brother LUIGI was a Jesuit missionary, and died of the plague in Rome in 1591. He was canonized as Saint Aloysius in 1726. Vicenzo was followed by his three sons, FRANCESCO, FERDINAND, and VICENZO, all of whom died without heirs, and thus the direct line of the ducal branch became extinct in 1627. A collateral branch in the person of Charles I., Duke of Nevers, son of Ludovico, the brother of Guglielmo, mentioned above, claimed the duchy, which was contested by his cousin, CESARE, Duke of Guastalla. This family feud led to a war, in which France supported Nevers, while the Emperor Ferdinand II. claimed the right of adjudging Mantua, as an Imperial fief, to a candidate of his choice. Spain supported Austria in this War of the Mantuan Succession. Mantua was stormed, sacked, and stripped of all its treasures by the Imperialists in 1630, and never regained its former splendor. The war was terminated a few months later, CHARLES DE NEVERS being recognized by the Emperor. The successors of Charles were weak and dissipated rulers, and the tenth and last Duke of Mantua, Charles IV., was the worst of all. As he had allied himself with the French in the War of the Spanish Succession, the Emperor Joseph I. placed him under the ban of the Empire, and he was deprived of his possessions, the Duke of Savoy seizing Montferrat, and Austria taking Mantua and the minor fiefs. This division was confirmed by the treaty of peace that followed. Charles died in exile in 1708, leaving no issue, and the family became extinct, save for the branch which ruled Guastalla until 1746. Consult: Letta, *Famiglie celebri Italiane*, vol. iv. (Milan, 1819 et seq.); Symonds, *The Renaissance in Italy* (7 vols., London, 1875-86).

GONZAGA, gŏn-zä′gȧ, THOMAZ ANTONIO (1744-1809). A Portuguese poet, born at Oporto. Having completed his law studies at the University of Coimbra, which he attended from 1763 to 1768, Gonzaga in the latter year went to Brazil, and after having acted for some years as local magistrate at Beja and elsewhere, he was appointed judge at Villa Rica, in the Province of Minas. Before this time he developed some talent for versification, and his literary tastes soon brought him into intimate association with Claudio Manoel, Alvarenga Peixoto, and other writers of the so-called Minas school; but the love which inspires the poet did not come upon him until he had made the acquaintance (c.1788) of Doña Maria Joaquina Dorothea de Seixas, the Marilia of his masterpiece, the *Marilia de Dirceu* (the latter being the name adopted by the poet himself). He had just been nominated a member of the Supreme Court of Bahia, and was on the eve of his marriage, when discovery was made of the treasonable plot of Minas, and he was arrested on suspicion of having been implicated in it. On merely circumstantial evidence, and that of a very inconclusive kind, he was condemned (1792) to banishment for life to Pedras de Angoche, a sentence which was afterwards commuted to one of ten years' exile at Mozambique. Here he made some effort to practice as an advocate, but he never recovered from the depression with which his cruel lot had affected him. He was attacked by nervous fever, which undermined his health, and after years of increasing melancholy, which occasionally alternated with fits of acute mania, he died. His poems are still favorites with the Portuguese-speaking peoples, chiefly because of the charm of their style, their melody, and their refined sentiment. At least fifteen editions of the *Marilia de Dirceu* have appeared since 1800. There are biographies prefixed to the editions of Rio Janeiro (1845 and 1862).

GONZALEZ, gŏn-sä′lĕs, MANUEL (1833-93). A Mexican soldier, President of the Republic from 1880 to 1884, born near Matamoras, Tamaulipas, Mexico. He entered the army at the age of nineteen, was associated with Father Javenta's guerrillas in 1843, and ten years later attained prominence as reactionary leader under Marcelino Cobos. In the succeeding civil wars he bore a conspicuous part, winning a reputation for dauntless bravery and shrewd military leadership. He received numerous wounds in action, one of which resulted in the loss of an arm. Under Juarez he fought brilliantly during the French invasion, was promoted brigadier-general for bravery in 1867, and after the fall of the City of Mexico was appointed by Juarez Governor of the Government palace. In 1871 he was arrested on a charge of complicity in the stealing of the gold and silver plate that had belonged to Maximilian, but in the revolution of the same year escaped and joined Diaz. He took part in the third rebellion of Diaz in 1876, distinguished himself in the decisive battle of Tecoac, and in 1878 was appointed by Diaz Secretary of War. In 1880 he resigned his portfolio to become a candidate for the Presidency, to which office he was elected. His administration was marked by financial mismanagement and disaster. His attempt to compromise the English debt, and his decree suppressing the liberty of the press, aroused such opposition that he resigned in 1884, in favor of Diaz. A resolution of impeachment for misappropriation of funds was introduced in the National Congress, but was not pressed, and he afterwards successfully administered the affairs of the State of Guanajuato, of which Diaz appointed him Governor.

GONZALO DE BERCEO, gŏn-thä′lō dȧ bȧr-thä′ō (c.1198-c.1268). A Castilian poet, born at Berceo (old Castile). He was a secular priest in the monastery of Saint Emilianus, in the Territory of Calahorra, and the oldest known Castilian poet. His poems are legends and stories of the saints in the vulgar tongue, and those consecrated to the Virgin are said to be graceful and touching. They were first published by Sanchez in *Colleccion de poesias castellanas anteriores al siglo XV.* (2d ed., Paris, 1842).

GOO′BER. See PEANUT.

GOOCH, FRANK AUSTIN (1852—). An American chemist, born at Watertown, Mass., and educated at Harvard University. In 1873 he became instructor in chemistry in the Lawrence Scientific School. A year later he was assistant in the chemical laboratory, and in 1877 assistant to Wolcott Gibbs. In 1879 he was connected

with the chemical laboratory of the Geological Survey at Newport as a special agent of the Tenth Census, and in 1881 was appointed chemist to the Northern Transcontinental Survey. His writings include contributions to the *Memoirs of the National Academy of Science*, to the *American Chemical Journal*, and to Tschermack's *Mineralische Mittheilungen*.

GOOCH, Sir William, Bart. (1681-1751). An English soldier and colonial Governor in America. He was born in Yarmouth, served with distinction in the English Army, and from 1727 to 1749 was Governor of Virginia. He was a man of considerable ability, and his administration was, on the whole, a wise and prosperous one. In 1740 he led the Virginia troops which accompanied Admiral Vernon on his futile expedition against Cartagena, New Granada. On his return to England in 1749 he was made a baronet.

GOOD, James Isaac (1850—). An American clergyman and Church historian, born at York, Pa. He graduated at Lafayette College in 1872, and at Union Theological Seminary in 1875. He was settled in Reformed Church pastorates in York, Pa., and Philadelphia until 1890, in which year he became pastor of a church at Reading, and professor of Church history in Ursinus College at Collegeville, Pa. In 1891 he was chosen dean of the Theological Seminary at that place. His publications include: *The Origin of the Reformed Church in Germany; The History of the Reformed Church in Germany; Rambles Around Reformed Lands;* and *History of the Reformed Church in the United States.*

GOOD, John Mason (1764-1827). An English physician and author, born at Epping, in Sussex. In 1784 he practiced as surgeon in Sudbury, but removed to London in 1793, with the view of obtaining literary employment. He published various poems, translations, and professional treatises. Of his original poems we need say nothing. Among his translations are: *The Song of Songs, or Sacred Idyls*, from the Hebrew (1803); *The Nature of Things*, from Lucretius (1805); and *The Book of Job* (1812). His chief professional works are: *The Study of Medicine* (4 vols., 1822), and *The Book of Nature*, a series of lectures at the Surrey Institution, 1811-12 (1826). He likewise published, in conjunction with Olinthus Gregory, a dictionary of the arts and sciences completed in twelve volumes (1813). The translation of Lucretius, valuable for its parallel passages, is included in Bohn's Classical Library. He died in London. For his *Life and Writings*, consult Gregory (London, 1828).

GOOD'ALE, Elaine (1863—) and Dora Read (1866—). American poets. They are sisters, and were born in Berkshire County, Mass. The sisters showed remarkable poetic precocity. Poems of Elaine appeared as early as her eighth year, in *Sky Farm Life*, a monthly conducted by herself. In 1877 verses of both sisters began to appear in the *Saint Nicholas* magazine, and their contributions to periodicals have since been frequent. The more noteworthy are collected in *Apple Blossoms* (1878); *In Berkshire with the Wildflowers* (1879); *All Round the Year* (1880); and *Verses from Sky Farm* (1880). In 1881 Elaine published *The Journal of a Farmer's Daughter.* In 1883 she became teacher in the Hampton (Virginia) Institute for the education of Indians and negroes, and in 1885 made a tour of observation through the Sioux Reservation. In the next year she received a Government appointment to teach Indians at White River Camp in Dakota, and in 1890 was made superintendent of all Indian schools in that State. In the next year she married Dr. C. A. Eastman, an Indian. Dora wrote also *Heralds of Easter* (1887).

GOODALE, George Lincoln (1839—). An American botanist, born at Saco, Maine. He graduated at Amherst College in 1860, and at the Harvard Medical School in 1863. He practiced his profession at Portland, Maine, until 1867, when he was appointed professor of natural science and applied chemistry at Bowdoin. In 1872 he was appointed instructor in botany, and university lecturer on vegetable physiology at Harvard, and in the following year was made assistant professor of vegetable physiology there. In 1878 he was elected to the chair of botany, and in 1888 was chosen Fisher professor of natural science, a chair formerly held by Asa Gray. He was appointed director of the Botanic Garden in 1879. In 1890 he was elected President of the American Association for the Advancement of Science. In addition to monographs and contributions to scientific journals, his publications include: *Wild Flowers of North America* (1882); *Vegetable Physiology* (1885); *Vegetable Histology* (1885); *Useful Plants of the Future;* and *Concerning a Few Common Plants.*

GOOD'ALL. A family of English artists. Edward (1795-1870) was a line-engraver chiefly known through his engravings of Turner's works, which he executed with great delicacy and beauty, and those of his son and pupil, Frederick (1822-1904), a genre painter in oil and water-color, born in London. His first oil painting was entitled "Finding the Dead Body of a Miner by Torchlight," for which the Society of Arts awarded him the silver medal. During the summers of 1838-42, he visited Normandy and Brittany, and in 1839, when but seventeen years of age, he exhibited his first picture at the Royal Academy, "French Soldiers Playing Cards in a Cabaret." His "Entering Church," as well as "The Return from a Christening," which received a prize of £50 from the British Institution, and others of his early pictures, were purchased by Mr. Wells. "The Tired Soldier," exhibited in 1842, was purchased by Mr. Vernon, and is now in the Vernon Gallery. Some of his French scenes are "Veteran of the Old Guard Describing his Battles;" "La Fête du Mariage" (The Marriage Feast); "The Wounded Soldier Returned to His Family;" "The Conscript." In 1844 he went for subjects to Ireland, and subsequently visited North Wales. His "Village Festival" exhibited in 1847, now in the National Gallery, "Raising the Maypole" (1851), and "Cranmer at the Traitor's Gate" (1856) are among the best of his English subjects. In 1853 he was elected associate, and in 1863 member of the Royal Academy. In 1857-59 he visited Venice and Egypt, and afterwards painted many Italian and Oriental subjects, including "Reciting Tasso" (1859), "Rising of the Nile" (1865), and "Flight into Egypt" (1885). Among his latest works are "Leading the Flock" (1894), and the "Thames from Windsor Castle" (1890).—Howard Goodall (1830-89), a younger brother of Frederick. He was a painter in water-color, and became member of the Water-Color Society in 1862.

His pictures were usually small subjects. He exhibited the "Lottery Ticket" at the Philadelphia Centennial of 1876, and published a series of *Rustic Sketches*.—FREDERICK TREVELYAN GOODALL (1848-71), son of Frederick Goodall, won the gold medal of the Royal Academy in 1869 with his "Return of Ulysses," but lost his life through an accident at Capri, on the threshold of a successful career.—HOWARD GOODALL (1850-74), youngest son of Frederick, exhibited at the Royal Academy in 1870 and 1873.

GOOD BEHAVIOR. A popular phrase, used chiefly as synonymous with keeping the peace. Thus, if one person assaults or threatens another, or provokes him to a breach of the peace, the offense is punishable summarily by justices of the peace, who, besides inflicting a fine, may bind over the offending party to keep the peace, and be of good behavior for a specified period. The mode of doing this is by requiring the offending party to enter into a recognizance with or without sureties, which is, in fact, the giving of a bond for a specified sum to the court, and if it is broken, that is, if the recognizance is forfeited, then the offending party may be again punished.

In early English law the expression had a more strictly legal signification, and had reference to the duty of chastity imposed upon a widow who enjoyed real property derived from her deceased husband, as in the case of free bench (q.v.).

GOOD CONDUCT BADGES. Special distinctions given in the United States Navy for fidelity, zeal, and obedience, and not granted for the first term of enlistment under continuous service. At the expiration of subsequent reenlistments for four years, within four months from date of discharge, men who are honorably discharged, who have sufficiently qualified in their duties, and who are recommended by their commanding officers, are entitled to these badges. The first badge is a medal; subsequent badges are clasps, with the name of the vessel from which each was given engraved thereon, and are worn on a ribbon above the medal. Any one having received three such badges under consecutive reënlistments is entitled to enlistment as a petty officer in the rating in which he is best qualified to serve, and can continue thereafter to hold the rating of a petty officer, from which he cannot be reduced excepting by sentence of court-martial. If the holder of a good conduct badge commit an offense for which the commanding officer considers he should be punished by forfeiture of one or more badges, the offenses are inquired into by a board of three officers, whose finding decides whether or not the badge is to be retained. If taken away, subsequent good behavior for one year entitles the offender to one good conduct badge, provided the commanding officer recommends it.

GOODE, GEORGE BROWN (1851-96). An American ichthyologist, born in New Albany, Ind. He graduated in 1870 from Wesleyan University, at Middletown, Conn., and then studied under Louis Agassiz. From 1871 to 1877 he was curator of the Museum at Wesleyan University, and in 1873 he became an assistant in the United States Fish Commission, and also a member of the scientific staff of the United States National Museum, of which he was made assistant director in 1881. From 1887 until his death he served as the assistant secretary of the Smithsonian Institution in charge of the National Museum. Goode was a prominent ichthyologist. He also was prominently connected with various popular and scientific exhibitions, as commissioner of the United States to the fisheries exhibitions at Berlin in 1880 and London in 1883, as representative of the Smithsonian Institution at the exhibitions at New Orleans in 1884, Cincinnati in 1888, Louisville in 1888, and Atlanta in 1895, and as successively commissioner and commissioner-general of the United States at the Columbian Historical Exposition at Madrid in 1892-93. He planned classifications for, and was one of the directors of, the United States Government exhibit at the World's Columbian Exposition at Chicago in 1893. In 1888 he was elected to the National Academy of Sciences; and at various times he received foreign honors, including the decoration of the Spanish Order of Isabella the Catholic, with the grade of commander. His publications number about four hundred, of which these are important: *Catalogue of Fishes of the Bermudas* (1879); *History of the Menhaden* (1880); editor of *Fisheries and Fishery Industries of the United States* (in 7 vols., 1884-87); *American Fishes: A Popular Treatise upon the Game and Food Fishes of North America* (1888); *Oceanic Ichthyology* (with Tarleton H. Bean, 1896). Goode was an authority on the management of museums, and wrote: *Museums of the Future* (1890); *Principles of Museum Administration* (1896); and *Annual Reports*, as director of the National Museum. He was also interested in historical studies, and wrote: *The Beginnings of Natural History in America* (1886); *The Beginnings of American Science* (1889); *The Origin of the National Scientific and Educational Institutions of the United States* (1890).

GOODELL', HENRY HILL (1839—). An American agricultural educator, born at Constantinople, Turkey. He graduated at Amherst College in 1862, and served in the Union Army during the Civil War. He was professor of modern languages and English literature in the Massachusetts Agricultural College (1867-86) and in 1886 became president of that institution. The degree of LL.D. was conferred on him by Amherst College in 1891. For many years, as chairman of the executive committee of the Association of American Agricultural Colleges and Experiment Stations, he exerted a wide influence in the great movement for agricultural education in the United States.

GOODELL, THOMAS DWIGHT (1854—). An American classical scholar, born at Ellington, Conn. He graduated at Yale in 1877, and received the degree of Ph.D. in 1884. He was classical teacher in the High School, Hartford, Conn., from 1877 to 1888, and in the latter year was appointed professor of Greek at Yale. He is author of various philological papers, and of *Chapters on Greek Metric* (1901), and *School Grammar of Attic Greek* (1902).

GOODELL, WILLIAM (1792-1878). An American editor and reformer, prominent as an abolitionist in the anti-slavery struggle before the Civil War. He was born in Coventry, N. Y.; was engaged in business successively at Providence, R. I., Alexandria, Va., and New York City; took part in the discussion of the Missouri Compromise, to which he was strongly opposed, and

in 1827 established at Providence a paper called the *Investigator*. He subsequently edited successively the *National Philanthropist*, the *Moral Daily Advertiser*, the *Friend of Man* (Utica, N. Y.), the organ of the New York State Anti-Slavery Society, the *Radical Abolitionist*, and the *Principia*—all devoted to the cause of abolitionism. Among his publications are: *Views of American Constitutional Law* (1844); *The Democracy of Christianity* (1851); *Slavery and Anti-Slavery: A History of the Great Struggle in Both Hemispheres* (1852); and *The American Slave Code* (1853). Consult a *Memorial of William Goodell* (Chicago, 1879).

GOODELL, William (1792-1867). An American missionary. He was born at Templeton, Mass., educated at Philips Academy (Andover), Dartmouth College, and Andover Theological Seminary. He was accepted as a missionary by the American Board and at the close of 1822 sailed for Malta, and thence the next year went to Beirut, where he aided in establishing the station which has become the centre of the Syrian mission. In 1828, on account of threatened war between England and Turkey, the missionaries removed to Malta, where Goodell labored in preparing and printing books for the mission; until, in 1831, the way having been opened by the destruction of the Turkish fleet at Navarino, he went to Constantinople, where he commenced the Armeno-Turkish mission. During his missionary life he and his devoted wife cheerfully endured many trials and perils, and were compelled to move their residence 33 times in 29 years. One of his chief labors was the translation of the Bible into Armeno-Turkish, in making and revising which he spent twenty years. In 1865, after forty-three years of toil, he returned to the United States, and died in Philadelphia at the residence of his son, February 18, 1867. Consult his life by Prime (New York, 1876).

GOOD FRIDAY. The Friday before Easter, observed in commemoration of the crucifixion of Christ. That from a very early period it was a day of solemn mourning and special prayer is apparent from the *Apostolic Constitutions* (i. 18) and from Eusebius, who tells us that when Christianity was established in the Empire, Constantine forbade the holding of markets, law courts, and other public proceedings upon this day. It is still a legal holiday in England and Ireland. A number of ancient popular customs, such as the eating of 'hot cross buns'—cakes with a cross impressed on them—are connected with the day. For its ceremonial observance in the Roman Catholic Church, see Cross; Holy Week. A service of modern origin, increasingly popular in Catholic and Episcopal churches, is the Three Hours' Devotion, consisting of addresses upon the seven last words of Christ, prayers and hymns, and occupying the hours from 12 to 3, when He hung upon the cross.

GOOD GRAY POET, The. A popular designation of Walt Whitman.

GOOD HOPE. See Cape of Good Hope.

GOOD'LAND. A city and the county-seat of Sherman County, Kan., in the northwestern part of the State; on the Chicago, Rock Island and Pacific Railroad (Map: Kansas, A 2). It has railroad repair-shops, a flour-mill, and a grain-elevator, and considerable trade in the products of the adjacent farming and stock-raising district. There are municipal water-works. Population, in 1890, 1027; in 1900, 1059.

GOOD'MAN'S FIELDS THEATRE. A London theatre, erected in 1729 and torn down in 1746. The theatre erected later upon its site was destroyed by fire in 1802. Garrick made his appearance on its stage in 1741, and many of his most successful performances occurred in this playhouse.

GOOD-NATURED MAN, The. A comedy by Goldsmith, produced by Colman at Covent Garden, January 29, 1768, after it had been fruitlessly offered about for nearly a year. Its plot is concerned with a virtuous but indolent spendthrift, Honeywood, who loses his money and nearly loses his sweetheart through fear of taking or giving any trouble.

GOOD'NOW, Frank Johnson (1859—). An American educator and legal scholar, born in Brooklyn, N. Y. He graduated at Amherst College in 1879, at the Columbia Law School in 1882, and studied at the Ecole Libre des Sciences Politiques of Paris and the University of Berlin. In 1883 he was appointed professor of administrative law at Columbia University. He came to be regarded as an authority on constitutional, administrative, and municipal law, and a frequent adviser in the legislative councils of New York State. His works include: *Comparative Administrative Law* (1893); *Municipal Problems* (1897); and *Politics and Administration* (1900).

GOOD PARLIAMENT. The English Parliament of 1376, famous for its attempts at political reform and for its impeachment of Latimer, Neville, and others.

GOOD QUEEN ANNE. A designation of Anne of Bohemia, wife of Richard II. of England.

GOOD QUEEN BESS. A popular name for Elizabeth, Queen of England.

GOOD REGENT, The. A title given to James Stuart, Earl of Murray, or Moray, who was Regent of Scotland between 1567 and 1570. He received it especially from the Protestants, whose champion he was. His name is absent from the numerous conspiracies of the times, and he was rigorous in suppressing the Border thieves.

GOOD'RICH, Alfred John (1847—). A widely known American musical theorist. He was born at Chilo, Ohio, and was practically self-taught, his instruction under his father for about one year being all the assistance he received. He held appointments as professor of theory in many of the leading musical institutions in the United States, and for two years served on the faculty of the Martha Washington College, Abingdon, Va. After 1899 he devoted himself to private teaching and writing. His essays and other published works include: *Music as a Language* (1880); *The Art of Song* (1888); *Complete Musical Analysis* (1889); *Analytical Harmony* (1894); and *The Theory of Interpretation*, published by subscription in 1898.

GOODRICH, Charles Augustus (1790-1862). An American author, brother of Samuel G. Goodrich (q.v.). He was born at Ridgefield, Conn.; graduated at Yale in 1812, was long pastor of congregations at Worcester, Mass., Berlin, Conn., and Hartford, Conn., and became favorably known through his writings, which include: *Lives of the Signers to the Declaration of Inde-*

pendence (1829); *Family Tourist* (1848); *Geography of the Chief Places Mentioned in the Bible* (1855); and *History of the United States* (1867).

GOODRICH, Chauncey Allen (1790-1860). An American scholar, born at New Haven, Conn., and son of Elizur Goodrich. He graduated at Yale in 1810, was a tutor there from 1812 till 1814, and then studied theology. He was ordained pastor of the First Congregational Church in Middletown, Conn., in 1816; but a year afterwards resigned his charge to become professor of rhetoric in Yale. This chair he held until 1839, when he was transferred to that of pastoral theology in the Divinity School. He published a *Greek Grammar* (1814); *Greek and Latin Lessons* (1832); *Select British Eloquence* (1852); and superintended the abridgment of *Webster's Dictionary* (1847). At the time of his death he was engaged in a revision of this work, which afterwards was published under the supervision of Noah Porter (1864). From 1829 till 1838, Dr. Goodrich edited the *Quarterly Spectator*.

GOODRICH, Elizur (1734-97). An American clergyman. He was born in Wethersfield (now Rocky Hill), Conn., graduated at Yale in 1752, and from 1756 to 1797 was pastor of a Congregational church at Durham, Conn. He devoted much of his time to the study of the mathematical and astronomical sciences, and wrote an excellent account of the aurora borealis of 1780.

GOODRICH, Frank Boott (1826-94). An American author, son of Samuel Griswold Goodrich. He was born in Boston, graduated at Harvard in 1845, and was for some time the Paris correspondent of the New York *Times*, writing under the signature of 'Dick Tinto.' His articles were published in book form in 1854, under the title *Tri-Colored Sketches of Paris*. Goodrich also published: *The Court of Napoleon* (1857); *History of Maritime Adventure, Exploration, and Discovery* (1858); *Women of Beauty and Heroism* (1859); *World-Famous Women, from Semiramis to Eugénie* (1890); and *Remarkable Voyages: or, Man Upon the Sea* (1873).

GOODRICH, Samuel Griswold (1793-1860). An American author, who wrote under the pseudonym 'Peter Parley,' and perhaps most widely known for his school histories. He was born in Ridgefield, Conn., August 19, 1793, and was the nephew of Chauncey Allen Goodrich. He was a book publisher in Hartford, and later in Boston, Mass., where he edited the *Token* (1828-32), an original annual noted for the encouragement given to young American authors. His numerous juvenile and educational works gave him a wide reputation. Altogether in his life he edited or wrote 170 volumes under his pseudonym, of which, however, he was sole author of only the following: *The Outcast, and Other Poems* (1836); *Sow Well and Reap Well: or, Household Education* (1838); *Five Letters to My Neighbor Smith* (1839); *Sketches from a Student's Window* (1841); *Ireland and the Irish* (1842); *Poems* (completed, 1851); and *Recollections of a Lifetime: or, Men and Things I Have Seen* (1856). He was United States Consul at Paris in 1852, where he published a statistical work on the United States. He died at Hartford, Conn., May 9, 1860.

GOODRICH, or **GOODRICKE,** Thomas (c.1485-1554). An English ecclesiastic and diplomat. He studied at Cambridge, probably at Corpus Christi, and in 1510 was made a fellow of Jesus College. As rector of Saint Peter Cheap (1529), he was consulted on the legality of the marriage of Catharine of Aragon, and was appointed syndic of Cambridge for the settlement of that question (1530). Soon after he became chaplain to the King, and in 1533 went to France on an embassy. In the following year he became Bishop of Ely, and proved a zealous partisan of the Reformation, urging the spiritual headship of the King and compiling the *Bishops' Book*. Under Edward VI. he became a member of the Privy Council, and was one of the compilers of the Book of Common Prayer. In 1552 he became Lord High Chancellor, and sealed Edward's settlement of confession, but was ignorant of its contents. He was pardoned by Queen Mary, and kept his bishopric until his death (1554).

GOODS AND CHATTELS. A legal as well as popular phrase, in common use, to signify personal property. It is not unfrequently used in wills, but seldom in any other legal instrument; and when used in wills, it generally includes all the personal property of the testator. The two words are not identical in meaning, however, the term chattels being the more extensive in signification and including the other. The term goods corresponds closely in meaning to the *bona* of the common law, and to *movables* of the civil law, whereas chattels includes as well certain rights in land. See Bona; Chattels.

GOOD'SELL, Daniel Ayres (1840—). A Methodist Episcopal bishop, born in Newburg, N. Y. He graduated at the University of the City of New York in 1859, and soon after entered the Methodist ministry. He was elected bishop in 1888. Besides contributions to the religious press, he wrote *Life and Character in Granite Bay* (1902), a book which, in its general character, suggests the genius of Burroughs.

GOOD'SIR, John (1814-67). A Scotch anatomist, born at Anstruther, Scotland. He studied at Saint Andrews University; graduated in medicine at the College of Surgeons, Edinburgh; practiced in Anstruther; was made conservator of the museum of the Royal College of Surgeons, Edinburgh (1840); acted as lecturer on pathology of tumors from 1842 to 1843; was assistant professor of anatomy, University of Edinburgh, from 1844 to 1846; and succeeded Munro as full professor of anatomy in 1846. Consult *Memoir*, by Turner (Edinburgh, 1868).

GOOD'STOCK. The alias which Lord Frampul assumes, as host of the New Inn, in Ben Jonson's play of the latter name.

GOOD TEMPLARS, Independent Order of. A secret benevolent society, having for its object the promotion of temperance, organized at Fayetteville, N. Y., in 1851. The Order grew rapidly, the first Grand Lodge having been established in 1852, and the Right Worthy Grand Lodge of North America in 1858. The Order was introduced in England in 1868, and in a short time spread throughout the civilized world. The question of admission of colored persons caused a schism in the organization in 1874, a section of the Order then organizing under the name of the Right Worthy Grand Lodge of the World. The two branches, however, reunited in 1887. The International Supreme Lodge projected a system

of temperance training and study covering a period of three years, to inculcate in members the principles of the temperance-reform movement. The organization at present comprises 100 grand lodges, aggregating 576,126 members, including 172,839 in the Juvenile Branch, distributed through the United States, Great Britain, Germany, Denmark, Sweden, Norway, etc. Members are obliged to pledge "that they will never buy, sell, use, furnish, nor cause to be furnished to others as a beverage, any spirituous or malt liquors, wine, or cider, and will discountenance the manufacture and sale thereof in all proper ways."

GOOD-WILL. The favorable disposition or inclination of persons to extend their patronage to a particular business, on account of the reputation it has established. It is something more than the probability that old customers will resort to the old place. It includes every advantage or benefit accruing to a business establishment from its locality, name, or common reputation, from its business habits, connections, and standing, or from any other matter which identifies and distinguishes it from other establishments. The good-will of a business is property as much the subject of valuation and transfer as any tangible chattel. It is an asset of a business, and may be taken into account in deciding whether a business establishment is solvent or involvent. In a litigated case in England the good-will of a partnership was valued at $100,000. The New York Court of Appeals has decided that the good-will of a corporation organized under the laws of another State, but having its place of business in New York, is taxable in New York as property employed there by the corporation. Upon the dissolution of a partnership, as in case of death of a partner, good-will must be converted into cash and its proceeds distributed, precisely as though it were tangible property. Upon a sale of the entire partnership business and assets, the purchaser becomes entitled to the good-will. This includes the sole right to hold himself out as the successor of the firm. In England and in some of our States, he acquires the right to use the old firm name, subject only to the qualification that he must not hold out the former partners as doing business under the old name. In other States, the right to use the old name does not pass with a sale of the good-will; it can be acquired only by express agreement therefor.

The extent to which the seller of the good-will of a business can compete with the buyer is a subject upon which the authorities are at variance. The tendency of modern decisions in England is to limit the seller more narrowly than the courts have felt disposed to do in this country. The English courts say that "it is not right to profess and to purport to sell that which you do not mean the purchaser to have; it is not an honest thing to pocket the price and then to recapture the subject of sale, to decoy away or call it back before the purchaser has time to attach it to himself and make it his own." Accordingly they hold that the seller of a good-will must not in any way solicit patronage from the customers of the old business, nor in any way represent himself as succeeding to such business. In the absence of a contract to the contrary, however, he may engage in the same line of business in the same locality, and in his own name, although that name may be a part of the old business name. In most of our States, if the purchaser of a good-will would cut the seller off from soliciting old customers or otherwise competing with him, he must secure from the seller a contract surrendering those rights. (Cf. RESTRAINT OF TRADE, CONTRACTS IN.) Consult: Pollock, *Digest of Partnership*, § 39 (London, 7th ed., 1900); Burdick, *Partnership* (Boston, 1899).

GOOD'WIN, ARTHUR (1593-1643). An English soldier, prominent during the Civil War in England. He studied at Magdalen College, Oxford, with his lifelong friend, John Hampden, and with the latter contributed Latin verses to the college collection, *Luctus Posthumus*, published on the death of Henry, Prince of Wales. In 1614 he took his degree of B.A., and became a member of the Inner Temple. He sat often in Parliament, and on the outbreak of the Civil War was appointed colonel of a regiment of cavalry which was of great assistance to the Parliamentary party. In 1642, aided by Hampden and Lord Brooke, he defeated the Earl of Northampton at Coventry, in Warwickshire, and with the aid of Colonel Hurry drove Lord Digby from Wantage. In January, 1643, Goodwin was appointed commander-in-chief of the forces of Buckinghamshire, was defeated in an attack on Brill, and took an active part in the siege of Reading.

GOODWIN, JOHN (c.1594-1665). An eminent Puritan divine. He was born in the county of Norfolk about 1594, graduated at Queen's College, Cambridge, and obtained a fellowship there in 1617. Having married, he gave up his fellowship and took orders, officiating in various places in the county with much acceptance. In 1632 he removed to London, and in 1633 succeeded John Davenport (q.v.) at Saint Stephens. In 1635 he was admonished for leanings toward independency. In 1639 he occasioned dissatisfaction by insisting on the need of a learned ministry. In 1642 he published *Anti-Cavalierisme*, in support of the Parliamentary cause, which received further commendation in *Might and Right Well Met* (1648). In 1643 he assailed the theory of the divine right of kings in his *Os Ossorianum; or, A Bone for a Bishop*, and in 1644 denounced the Presbyterians as a persecuting party in *θεομαχία; or, The Grand Imprudence of Fighting Against God*. In 1645 he was ejected from his living for refusing to administer the sacrament to all indiscriminately, and formed an independent church, which was largely attended. At the Restoration he was one of eighteen incapacitated from holding any public trust. He died in 1665. Many of his publications, though all in English, have Greek or Latin titles. He has been a favorite with Methodists, and been called the 'Wiclif of Methodism.' John Wesley abridged his *Treatise of Justification* (London, 1642). Samuel Dunn, a Wesleyan minister, edited his *Christian Theology* (London, 1836), from Goodwin's works, and wrote his life. The standard life of Goodwin is by Thomas Jackson, another Wesleyan minister (London, 1872).

GOODWIN, NATHANIEL CARL (1857—). An American comedian. He was born in Boston, and after a brief experience in business made his début (March 5, 1874) at the Howard Athenæum, in a piece called *Law in New York*.

His success in imitating personal peculiarities led him to the variety stage, and at Pastor's Theatre, in New York (1875), he became very popular. Later he made a hit in the burlesque of *Black-Eyed Susan*. He married in 1877 Eliza Weathersby, an actress, under whose name his company toured successfully. Most of his work was in lighter comedy, till in 1889-90 he appeared as Woolcott in *A Gold Mine*. The following summer he first played in England. Among his productions since have been: *A Gilded Fool; In Mizzoura; An American Citizen; Nathan Hale*, his greatest success (produced in Chicago, January 31, 1898); and *The Cowboy and the Lady*. In 1898 he married Maxine Elliott (q.v.), who has shared his recent achievements. His new play, *The Altar of Friendship*, was very popular in 1902-03. Consult: Strang, *Famous Actors of the Day in America* (Boston, 1900); McKay and Wingate, *Famous American Actors of To-Day* (New York, 1896).

GOODWIN, Mrs. N. C. See Elliott, Maxine.

GOODWIN, Thomas (1600-80). An English divine of the later Puritan period. He was born at Rollesby, Norfolk, studied at Cambridge, and became a fellow in 1620. In 1625 he was licensed a preacher of the university, and three years later became lecturer of Trinity Church, Cambridge, and was presented the vicarage by the King in 1632. Harassed by the interference of his bishop, who was an adherent of Laud, he resigned his preferments and left the university in 1634. He then seems to have lived for some time in London as a separatist preacher. In 1639 he withdrew to Holland, and for a few months was pastor of a small congregation of English merchants and refugees at Arnheim. Returning to London soon after Laud's impeachment by the Long Parliament (1640), he ministered for ten years to an independent congregation in the parish of Saint Dunstan's-in-the-East, and rapidly rose to considerable eminence as a preacher. In 1643 he was elected a member of the Westminster Assembly, and at once identified himself with the Congregational party. He frequently preached by appointment before the House of Commons, and in January, 1650, his talents and learning were rewarded with the presidentship of Magdalen College, Oxford, a post which he held until the Restoration (1660). He rose into high favor with the Protector, and ultimately became somewhat prominent among his more intimate advisers. From 1660 until his death, February 23, 1680, he lived in London, and devoted himself exclusively to theological study and to the charge of a small congregation. Five volumes of his works were published at London (1682-1704).

GOODWIN, William Watson (1831—). A distinguished American classical scholar, born at Concord, Mass. He was graduated from Harvard in 1851, and then continued his studies at the universities of Bonn, Berlin, and Göttingen, receiving from the last place the degree of Ph.D. in 1855. He was tutor at Harvard 1856-60, when he was appointed Eliot professor of Greek. In 1901 he became Eliot professor emeritus. He was the first director of the American School of Classical Studies at Athens (1882-83), and in 1872 and 1885 was president of the American Philological Association. In 1860 he published the first edition of his *Syntax of the Moods and Tenses of the Greek Verb*. This work has contributed more than any other to the elucidation of Greek syntax in America and England, and has received generous recognition in Germany. It was published in revised and enlarged form in 1890. He has also published a *Greek Grammar* (1870; last ed. 1893) and various other text-books, and has been a contributor to American journals and scientific publications. Professor Goodwin has received the degree of LL.D. from Amherst (1881), Cambridge, Eng. (1883), Columbia (1887), Edinburgh (1890), Harvard (1891), Chicago (1901), Yale (1901); D.C.L., Oxford (1890); and is also a Knight of the Greek Order of the Saviour.

GOODWIN SANDS. Dangerous banks of shifting sands stretching for a distance of about 10 miles northeast and southwest, off the east coast of Kent, England, at an average distance of from 5 to 12 miles from the shore (Map: England, H 5). The sands are divided into two portions by a narrow channel, and at low water many parts are uncovered. When the tide recedes the sand becomes firm and safe; but after the ebb the water permeates the mass, rendering the whole pulpy and treacherous, in which condition it shifts to such a degree as to render charts uncertain from year to year. They have always been dangerous to vessels passing through the Strait of Dover, bound either for the Thames or traversing the North Sea. They serve, however, as a breakwater to form a secure anchorage in the Downs (q.v.) when east or southeast winds are blowing, but become dangerous when the wind blows strongly off shore, at which time ships are apt to drag their anchors and to strand upon the Goodwin breakers, in the shifting sands of which their wrecks are soon entirely swallowed up. Many celebrated and terribly fatal wrecks have occurred here, and many gallant rescues by local seamen have been made. Numerous buoys, fog-sirens, warning guns, four lightships, and the North and South Foreland lighthouses, now afford a valuable system of warning and protection. These sands are said to have consisted at one time of about 4000 acres of lowland, fenced from the sea by a wall. At the period of the Norman Conquest these estates were taken from Earl Godwin and bestowed upon the Abbey of Saint Augustine at Canterbury, the abbot of which allowing the sea wall to fall into a dilapidated condition, in the year 1100, the sea rushed in and submerged the whole. Near the Goodwin Sands the Dutch won a naval victory over the English in 1652.

GOOD'WOOD. An estate of the Duke of Richmond and Gordon, three miles east of Chichester, Sussex, England, chiefly noted for the annual race meeting held in July on the course established in the park in 1802. The castle, an eighteenth-century structure, has a fine collection of portraits by old masters; the park is celebrated for the beauty and variety of its trees, and contains herds of deer. In it is a temple containing a Roman relief of Neptune and Minerva found at Chichester.

GOODY BLAKE AND HARRY GILL. A poem by Wordsworth, the story of a poor old woman who to make a fire in bitter weather picked up a few sticks from the land of her neighbor, a farmer. When detected by him and

prevented from removing the fuel, she prays that he may never again be warm, and her curse is effective.

GOOD'YEAR, CHARLES (1800-60). An American inventor, born at New Haven, Conn. He was the son of an iron-manufacturer, with whom, at the age of twenty-one, he went into business in Philadelphia. Failing in the iron trade, his attention was attracted to the manufacture of india-rubber, and he expended all his means in experiments with various mixtures and processes which should remedy the fatal defects of india-rubber in its natural state, since it is brittle in cold weather and sticky in warm weather. His efforts were a series of failures, excepting a partial success in treating the surface of rubber goods with nitric acid, until he bought of one Hayward, a rival experimenter, an invention for mixing india-rubber with sulphur. The great secret of vulcanizing, a process in which the two substances, submitted to a high temperature, are converted into the elastic, enduring, and heat and cold defying material now in use, was an accidental discovery made by Goodyear while standing by a stove, and idly subjecting a mixture of rubber and sulphur to its heat. This new product he patiently perfected, discovering new uses to which it could be applied, until it required sixty patents to secure his inventions. Some of these rights were secured by other persons in England, and in France they were forfeited by an informality; so that, by these means, and from expensive lawsuits, he gathered little from ten years of toil and privation save the honors awarded to his skill and perseverance in giving to the world such a staple as vulcanized india-rubber. He died in New York, July 1, 1860. See RUBBER.

GOODY TWO-SHOES. A familiar nursery tale published by Newbery in 1765 and ascribed to Oliver Goldsmith. It derives its name from the joyful exclamation of its half-shod little heroine, when she comes into possession of a pair of shoes.

GOOGE, BARNABE (1540-94). An English poet. He was born in 1540, at Alvingham in Lincolnshire, studied at Cambridge and at Oxford; traveled on the Continent, and on his return became one of the gentlemen pensioners in the Court of Queen Elizabeth. He died in 1594. He wrote translations, eclogues, epitaphs, and sonnets. Consult: "Eglogs, Epytaphes, and Sonettes," in Arber, *English Reprints* (London, 1871); and *The Popish Kingdome* (1570), a verse translation from the Latin of Thomas Naogeorgus (i.e. Thomas Kirchmayer), edited by Hope (London, 1880).

GOO'KIN, DANIEL (c.1612-87). A New England soldier and historian, born in Kent, England. Gookin came with his father to Virginia in 1621, but, sympathizing rather with the Puritan than with the Cavalier, he moved, in 1644, to Cambridge, Mass., where he was soon made captain of militia, and elected to the House of Deputies, of which he became Speaker in 1651. In 1652 he was elected magistrate, and in 1656 appointed superintendent of all Indians under civil authority. He held this office till death, in spite of unpopularity, occasioned by the protection he gave to his wards during and after King Philip's War. He was associated with Eliot in mission work among the Indians. He visited England in 1656 and again in 1657, efficiently protecting on his return in 1660 the fugitive regicides Goffe and Whalley. In 1674 he wrote *Historical Collections of the Indians of Massachusetts* (published by the Massachusetts Historical Society, 1792), and later a never-published and now lost *History of New England*. In 1677 he finished *An Historical Account of the Doings and Sufferings of the Christian Indians of New England*, which was sent to England, and there lost for over a century and a half, when it was found and printed in 1836 by the American Antiquarian Society. In 1681 Gookin was made major-general of the colony, and was an active asserter of popular rights in the agitation which preceded the withdrawal of the Colonial Charter (1686). This restored his popularity, but when he died in Cambridge, Mass., March 19, 1687, he was so poor that his friend Eliot solicited ten pounds from Robert Boyle for his widow. He was a man of fine character, and an historian of balanced judgment and dignified though not easy style. The prospectus of his *History of New England* is so thorough that its loss is felt by students to be a real misfortune.

GOOLE. A market-town and river-port in the West Riding of Yorkshire, England, 22 miles south-southeast of York, on the right bank of the Ouse at its junction with the Don (Map: England, F 3). The town is well built and possesses fine modern public buildings. Water and gas are supplied by private companies. It has iron-foundries, ship and boat building establishments, and extensive manufactories of woolen and cotton goods, ropes, sails, alum, sugar, and agricultural implements. It has a commodious harbor, docks, quays, and warehouses, and imports raw wool, linen yarn, timber, logwood, indigo, oil, wines, farm produce, and groceries. Its chief exports are coal, woolen and linen goods, and machinery. The annual value of its imports and exports during five years ending in 1900 exceeded £12,000,000 ($60,000,000). An average of 2500 vessels enter and clear a gross tonnage of 1,500,000 annually. Its rise from an obscure hamlet dates from its establishment as a bonded port in 1829. Population, in 1891, 15,400; in 1901, 16,600.

GOORKHAS, gōōr'kas. See GURKHAS.

GOOROO, gōō'rōō. See GURU.

GOOSANDER. See MERGANSER.

GOOSE (AS. *gōs*, Icel. *gās*, OHG. *gans*, Ger. *Gans;* connected with Lat. *anser*, Gk. χήν, *chēn*, OIr. *géis*, Lith. *zansis*, Skt. *haṁsa*, goose, also ultimately with OHG. *ganazzo*, AS. *ganot*, Eng. *gannet*, and AS. *gandra*, Eng. *gander*). A web-footed bird of the subfamily Anserinæ, of the family Anatidæ, order Anseres (q.v.). The geese are closely allied to the swans on the one hand, and to the ducks on the other. They differ from the swans in having the lores feathered, and from the ducks in having the tarsi reticulate and the sexes alike in color. The geese form a fairly well defined group of about forty species found in all parts of the world. They are mostly larger than ducks and have longer necks. They are more terrestrial and many times are to be seen feeding on land herbage. They walk better than ducks, the legs not being quite so far back. Most of them are good eating, but there are a few which are animal feeders, whose flesh is rank. Like the swans, they resent intrusion by hissing

with outstretched neck. They utter characteristic notes called *honking* when on the wing. They generally fly in companies, each led by an old gander, which they follow in a wedge-like formation.

Wild Geese. Of the ten or twelve species of geese occurring in the United States, all but two or three breed in the far north, and are migrants and winter visitants south of Canada. The common wild goose (*Branta Canadensis*) is aburdant throughout North America. It is about three or three and one-half feet long and five feet across the wings. The head and neck are black, with a white patch on the chin; general color brownish-gray, paler below. The nest is usually on the ground, but sometimes in trees. The eggs are usually five or six, plain buffy white. A remarkable Arctic goose is the emperor goose (*Philacte canagica*), about two-thirds as large as the common goose, abundant on the shores of Bering Sea; the flesh is said to be rank and unfit for food. The snow-goose (*Chen hyperborea*) is a pure white one found throughout America, but rather rare in eastern parts. The so-called 'tree-ducks' (Dendrocygna) are tropical American geese occurring as far north as Texas in the summer. They are only about twenty inches long and are colored with various shades of yellowish and reddish brown. They make their nests in hollow trees, often some distance from water.

Among the notable geese of the Old World must be mentioned the graylag goose (*Anser ferus*), which is thought to be the ancestral stock of the common domesticated goose. (See Colored Plate with Water-Birds.) It is found in Central Europe and Asia, and in North Africa. Another, common in Great Britain, is the bean-goose (*Anser sergetum*), small and brownish, with a black 'nail' on the beak. The spur-winged goose (*Plectropterus Gambensis*) is a purplish-black bird with prominent spurs on the wings, found in Africa. In Australia there are two very remarkable geese, one (*Anseranas melanoleuca*) with the feet little more than half webbed, and the other (*Cereopsis Novæ-Hollandiæ*), a scarcely aquatic bird, with long legs having the tibia partly bare, and the bill small and membranous. Among the best-known of the geese are the brants and barnacle-geese (qq.v.). See Plate of Wild Ducks.

Domestic Geese. The domestication of the goose was very easy, and doubtless began as soon as men began to remain in fixed settlements. They are among the animals figured on the oldest Egyptian and Asiatic monuments, and the Oriental breeds were no doubt derived from local wild species, especially the great Chinese swan or 'guinea' goose (*Cygnopsis cygnoides*), whose true home is in the valley of the Amur River. This is the largest of living geese, and wild and domesticated specimens are freely crossed to this day with other breeds. The basis of the domestic geese of Europe, however, is the graylag above described; and this kind was imported by the early colonists to America, where some admixture has taken place with local wild geese. Formerly the cultivation of geese was more extensive and important than at present. Great herds of geese were annually driven slowly from Western Europe to Rome, where both flesh and feathers (down) were in great demand. Previous to the invention of metallic pens goose-quills supplied all the pens used, and formed a large article of trade now almost obsolete. In Southern England goose culture was formerly far more extensive than at present, many thousands being driven to market every fall; and goose-fattening in Holland and Germany is still a great industry, especially in the neighborhood of Strassburg. The long domestication of geese, however, has brought about remarkably little variation. As is pointed out by Darwin in his *Animals and Plants Under Domestication*, the change has been little more than a considerable increase in size and fecundity, and a tendency to lose the brownish tints of the wild stock and become spotted with white or altogether white. The last feature has resulted not only from a preference for pure white which has prevailed ever since the time of the Romans, but from the former cruel practice of plucking geese alive, the new feather produced by the injured skin being usually white.

The standard breeds commonly raised in the United States are Gray Toulouse, White Embden, Gray African, Brown Chinese, White Chinese, Gray Wild, and Colored Egyptian. A number of cross-bred geese have also given good results. In general Toulouse geese are more compact in form than are other breeds, and for this reason are preferred by many. The head is rather large and short and the bill comparatively short. The neck is carried well up and is of medium length. The breast is broad and deep. The body of the Toulouse goose is moderate in length, broad, deep, and compact. In birds of good condition the belly almost touches the ground. The wings are large and strong; the tail comparatively short; the thighs and shanks stout. In color the plumage is gray. The standard weight of the adult gander is 20 pounds; adult goose, 20; young gander, 18; and young goose, 15 pounds. They are termed Christmas geese, since they mature later than others and are in season at the holiday time. They are fairly good layers, averaging 40 eggs in a season. See Colored Plate of Ducks.

White Embden geese are beautiful birds of large size, tall and erect carriage, snow-white plumage, and are about as heavy as the gray Toulouse goose. They originally came from Embden, in Westphalia, and have been bred in the United States for many years. They are considered a very satisfactory breed to raise. Gray African geese are by many considered the most profitable of all. They grow very rapidly, and are ready for market in ten weeks, weighing at that age between eight and ten pounds. According to standard weights they are as heavy as Toulouse and Embden, but heavier specimens are not uncommon.

The brown and white Chinese geese are smaller than those previously mentioned, and probably for this reason less popular. The domesticated gray wild geese are satisfactory, and are generally bred throughout the United States. They are very highly prized for table purposes, are good layers, hardy, and easy to raise. The standard weight of the adult gander is 16 pounds; adult goose, 14 pounds; young gander, 12 pounds; and young goose, 10 pounds.

The colored Egyptian geese are purely ornamental, being seldom bred for other purposes than the show-room. They are sometimes called Nile geese. They are tall and slender. The color of the head is black and gray; the bill is purple or bluish-red and the eyes orange. The neck and back are gray and black; the centre of the breast

is chestnut, with the other part gray. The upper parts of the plumage of the body are gray and black, and the under parts are a pale yellow, penciled with black.

Breeding. Geese are long-lived birds, some having been known to attain the age of forty years. Birds fifteen and twenty years old are not uncommon. Mature geese, at least two years old, should always be used for breeding. Breeding stock should be pastured in the fall, and later fed on grain with some beef scraps. Ten per cent. of the ration should be green feed, stewed clover and cooked vegetables. The eggs may be hatched by hens or by geese. When goslings are four or five days old they are able to take care of themselves, but should always be cooped at night. The first food of goslings is grass fed as sod, and a little corn meal sometimes mixed with a little sand and charcoal. Very soon they may be fed a mixture of ground grains, grass, and vegetable food. When young geese are fattened they should be placed in a rather small pen so that they may not exercise too much, and should be fed three times a day a mixture of corn meal and beef scraps. They should be kept as quiet as possible. At ten weeks of age, or when the tips of the wings reach the tail, they should be ready for market. Geese require a wider range than do ducks, and, unlike the latter, will not do well unless they have access to water.

Economic Uses. Geese are valuable for their feathers, quills, eggs, and as food. The flesh is most commonly roasted. It contains on an average some 18 per cent. refuse (waste, bones, etc.), and 82 per cent. edible portion. The edible portion has on an average the following percentage composition: Water, 46.7; protein, 16.3; fat, 36.2; and ash, 0.8. Goose-livers are esteemed a delicacy. The liver, morbidly enlarged by excessive feeding combined with lack of exercise, is used for making a delicately seasoned, paste-like food called *pâté de foie gras*, for the manufacture of which Strassburg is especially famous. In Germany the breast is pickled and smoked under the name of Pomeranian goose-breast. Goose-fat is used to a large extent for culinary purposes, especially by Mohammedans and Jews. Consult Howard, "Ducks and Geese," in *United States Department of Agriculture, Farmers' Bulletin No. 64* (Washington, 1897).

GOOSE, Tailor's. A name applied to the smoothing-iron used by tailors, and supposed to have been given on account of the shape of the handle, which somewhat resembles the neck of a goose.

GOOSE-BARNACLE. See Barnacle-Goose.

GOOSEBERRY, gōōz′bĕr-rĭ *or* gōōs′-. The fruit of a prickly shrub of the genus Ribes, order Grossulariaceæ. The genus is common throughout the north temperate zone, being represented by numerous species in America, Europe, and Asia, the great majority of which belong to North America. Of all these only four or five species have attained prominence in cultivation. The currant (q.v.) (*Ribes rubrum*) is one of the most important representatives of the genus, and carries its distribution into the Orient. In the gooseberry, however, we find a very popular shrub in both the New and the Old World; it is especially prized in England, where it has attained its highest perfection, and where it has been in cultivation from the sixteenth century. Since it occurs only sparingly in Southern Europe, where the grape thrives so well, it is little wonder that the gooseberry was neglected by the Greeks and Romans, even if they were familiar with it. The European gooseberry (*Ribes grossularia*) is in its natural state a strong-growing upright shrub with very formidable spines upon the branches and a hairy, more or less spiny, fruit. It is the progenitor of all the mammoth

FRUITING TWIG OF GOOSEBERRY.

fruited varieties which have caused so much emulation among the gardeners of England, who have produced fruits weighing as much as 30 pennyweights; the unimproved fruits hardly average four pennyweights in weight. Varieties of this species were brought to America by the early pioneers, but the climate was uncongenial, and they suffered from disease and soon perished. Not until the middle of the nineteenth century could America claim to have a cultivated gooseberry, and then only a seedling of one of the wild forms, *Ribes oxyacanthoides*, common throughout the country. This was Houghton's seedling, which, however, is not the most common wild species even at its place of origin, Massachusetts. It was soon followed by one of its own progeny, Downing's seedling or Downing. The popularity and universal cultivation of these two, which are still in the lead, is due largely to their ability to resist mildew. With the advent of spraying to check plant diseases a new era opened for European gooseberries in America; and since 1890 the English varieties have been planted with more assurance of success. There are now numerous hybrids of the European with native species, which promise to combine the resistant characters of the latter with the desirable size, color, and form of the former.

The gooseberry is easily propagated by means of suckers, cuttings, and layers; cuttings are most frequently employed, as they grow readily and give a well-formed plant. The gooseberry thrives on all good arable soils and demands the same treatment as the currant. It is usually planted three by six feet apart in field culture, kept free from weeds, and sprayed with an arsenical poison early in the season to protect it from the worm which is as fond of it as it is of the currant. If the English varieties are grown the poison must be supplemented with a fungicide. The fruits of the gooseberry are used extensively for jelly, jam, marmalade, etc., both in England and in America. The ripe fruits are also used to some extent in the manufacture of wines and vinegar.

Besides the two species above mentioned, the following species, being ornamental, should receive

more attention than they do from horticulturists: The snow-flowered gooseberry (*Ribes niveum*), a native of the northwestern coast of America, is remarkable for its beautiful white pendulous flowers and its acid berries, which in size and color resemble black currants, and which make delicious pies. *Ribes speciosum* is ornamental in pleasure grounds, and is remarkable for its shining leaves, as well as for its flowers having four stamens, instead of five, as in other species, and for the great length of the filaments. *Ribes saxatile*, a native of Siberia, and other species, forming a subgenus called Botrycarpum, have a character somewhat intermediate between currants and gooseberries, being prickly shrubs, but having their flowers in racemes. *Ribes saxatile* has small, smooth, globose, dark-purple berries, like currants. Consult Card, *Bush Fruits* (New York, 1898).

GOOSEBERRY, INSECTS INJURIOUS TO THE. The gooseberry is injuriously attacked by several borers, etc., harmful to currants (see CURRANT-INSECTS). Two caterpillars, however, are especially harmful. The most prominent one in the Old World is the magpie moth (*Abraxas grossulariata*), closely related to the canker-worm, whose caterpillar is the worst enemy of the gooseberry in Europe. In the United States the most damage is done by the gooseberry fruit-worm (*Dakruma convolutella*), the larva of a pyralid moth about one inch across the wings, which are "pale gray crossed near the base by a dark diffuse band which is divided by a whitish line." The eggs are laid by the female moths on the young fruit, one on each; and when the young hatch they bore into the berry and feed on the pulp. The caterpillars are about an inch in length, pale green, with brownish heads. As they grow they bind several berries together with silk. Finally, they drop to the ground, form cocoons beneath the leaves, and spend the winter there in the pupa state, from which they emerge in the spring. The only practical and effective remedy seems to be to watch the bushes, and pick off and destroy the reddish infected berries early in the season. The small clearwing (*Ægeria tipuliforme*) is also harmful in some places.

GOOSEBERRY INSECTS.
a, Gooseberry moth (*Abraxas grossulariata*) and larva; *b*, Currant-borer, the clearwing (*Ægeria tipuliforme*).

GOOSE-BIRD. A gunner's local name in the United States for the Hudsonian godwit (q.v.).

GOOSEFISH. See ANGLER.

GOOSEFLOWER. See ARISTOLOCHIA.

GOOSEFOOT. See CHENOPODIUM.

GOOSE-GRASS, or CLEAVERS. A coarse-stemmed annual species of bed-straw with whorls of six to eight leaves. The hispid stems, leaves, and fruit cling to clothing and to animals. A somewhat similar species is Galium tricorne, introduced from Europe into a number of places in the United States. There are more than a dozen species in the United States, none of which are of much importance except as weeds. See ELEUSINE.

GOO'TOO (Jamaica negro). A name in Jamaica for various small globefishes (q.v.).

GO'PHER. A name of somewhat indefinite significance, used in different localities to designate different animals. It is a corruption of the French word *gauffre*, a honeycomb, which was applied by the French settlers in America to various burrowing animals which 'honeycomb' the soil.

(1) Any of several American rodents, belonging to two distinct families, the Geomyidæ and the Sciuridæ, subfamily Spermophilinæ. The true gophers belong to the first mentioned family, the spermophiles being more properly ground-squirrels (q.v.). The Geomyidæ are known as pouched rats or pocket-gophers. They are characterized by very large external cheek-pouches, which are lined with fur. They do not communicate with the mouth, but open beside it. In some species, they run along the whole side of the neck as far back as the shoulders. These pouches seem to be used largely for carrying food. The front feet have large claws and are otherwise fitted for digging. The tail is short and the ears are small. There are only two genera—Geomys, with perhaps half a dozen species, and Thomomys, with four or five smaller species. All of the pouched rats are confined to the western half of North America, except two species of Geomys, which occur in the Gulf States, and they range from Central America northward to British Columbia. The most common species (*Geomys bursarius*) is found in Canada, Missouri, Illinois, Iowa, Texas, Mexico, and the Gulf States, but not north of the Saskatchewan River. It is about 9 inches long, with an almost hairless tail about 2 inches long, and weighs about 13 ounces. Its legs are short; fore feet strong, and well adapted for burrowing, having five claws, the three middle ones very large and long. The claws on the hind feet are small, but the two middle ones longer than the others, the interior one being almost rudimentary. It has 20 teeth: 8 upper and 8 lower molars, and 4 incisors which are very strong, especially the lower pair, which are much stronger than the upper. The ears are very small. The animal is reddish-brown on the back and sides, ashy beneath, and has white feet. It burrows in sandy soils, throwing up the earth in little mounds, and its work is surprisingly rapid and extensive. It subsists on grass, roots, nuts, buds, and farm vegetables. The roots of trees often suffer severely from its attacks. The pouches which cover the side of the head are capable of being so distended as to enable the animal to carry a considerable load of provisions. The true Southern gopher, or Georgia hamster (*Geomys tuza*), is a larger animal, found in Alabama, Georgia, and Florida. By a strange misapplication of names, the gophers of the Southern States are often called 'salamanders,' although the latter word is almost universally applied to the tailed amphibians, and its use should properly be confined to that group. On the Pacific Coast there are several kinds of gophers. Some are 6½ inches long, with a tail nearly 3 inches,

cheek-pouches large, resembling the thumb of a glove, hanging down by the side of the head. When in the act of emptying its pouches the animal sits on its hams, like a marmot, or squirrel, and squeezes the sacks against its breast with its chin and fore paws. All those not inhabiting warm climates hibernate. A familiar species in the Northwest is the camass-rat (*Thomomys talpoides*).

Similar animals inhabit the plains of other parts of the world, as South Africa, Russia, Tartary, and India. Everywhere that civilization has caused a lessening of natural enemies, such as weasels, badgers, skunks, foxes, wolves, hawks, owls, serpents, and the like, these animals have increased to the proportions of a pest, and must be combated by poison, by flooding their burrows, suffocating with sulphur fumes, or similar means; in view of which such native carnivorous animals and birds as the coyote, badger, skunk, ferret, and all the hawks and owls should be preserved to the limits of toleration as assistants in keeping down these and other harmful rodents, such as the mice. See accompanying Plate. Consult: Coues, *Geomys and Thomomys* (Washington, 1875); Herrick, *The Mammals of Minnesota* (Minneapolis, 1892).

(2) A tortoise. See GOPHER TORTOISE.

(3) A serpent. See GOPHER SNAKE.

GOPHER SNAKE (so called because it burrows like a gopher), or INDIGO SNAKE. A large colubrine serpent (*Compsosoma corais*, variety *Couperii*) of the Southern United States, 10 feet in length, black, with reddish markings about the mouth and forward part of the belly. It is regarded by the negroes as a mortal enemy of the rattlesnake (see KING-SNAKE), and is rarely molested by them. This variety passes into a variety (*melanurus*) of Mexico and Central America, and that into the typical *Compsosoma corais* of South America, which is light brown, with a black oblique stripe on each side of the neck.

GOPHER STATE. Minnesota. See STATES, POPULAR NAMES OF.

GOPHER TORTOISE. A turtle (*Xerobates polyphemus*) of the sandy coast districts of the Southern United States. The shell, brown and black above and yellow below, measures 15 inches in length, the females being larger than the males. These tortoises are strong animals, burrowing deeply into the soil, where they pass the hot part of the day in pairs, and hibernate in winter, and whence they come out at night in search of vegetable food. They are numerous and somewhat gregarious, especially in Florida, and do much damage in gardens and among root crops. The rural negroes seek them for food, and also search for their buried eggs, which are as large as the eggs of a pigeon and five in number. The animal is thus an important food resource in Florida, where it is captured largely in pit traps. Other similar species inhabit the Southwestern Territories and Northern Mexico.

GOPHER WOOD. The wood of which Noah's ark was made (Gen. vi. 14). The word occurs only in this passage, is not found in the Semitic languages other than Hebrew, and its true meaning is not known. It has been conjectured to be akin to the Hebrew *kopher*, bitumen, or *gophrith*, pitch; but it is hard to see what connection this can have with Noah's ark. Some resinous wood seems to be required, and opinion vacillates between the cedar and the cypress.

GÖPPERT, gē′pĕrt, HEINRICH ROBERT (1800-84). A German paleontologist and botanist, born at Sprottau, and educated at Breslau and Berlin. He was teacher at the Medico-Chirurgical Institute for twenty years, and became professor of botany at the University of Breslau in 1831. During the last thirty years of his life he was director of the botanical garden of Breslau. Besides his important compilation and classification of all fossilized plants known prior to 1850 in Brown's *Index Palæontologicus* (1848-50), he wrote a very large number of works, chiefly on vegetable physiology and phytopaleontology. Among these are: *Die fossilen Koniferen verglichen mit denen der Jetztwelt*, with 58 plates (1850); *Skizzen zur Kenntnis der Urwalder Böhmens und Schlesiens* (1868); *Ueber die fossile Flora der silurischen, devonischen, und untern Kohlenformation* (1860); *Die Flora des Bernsteins* (1883).

GÖPPINGEN, gē′pĭng-en. A town of the Kingdom of Württemberg, Germany, situated on the Fils, 26 miles by rail from Stuttgart (Map: Germany, C 4). It has an old castle, built in the sixteenth century. It is an important industrial centre, with manufactures of cotton goods, machinery, and corsets. Population, in 1890, 14,352; in 1900, 19,384, principally Protestants.

GORAKHPUR, gō′rŭk-pōōr′. A division of the Northwest Provinces, British India, bounded on the north by Nepal, and on the south by the Gogra River. Area of division, 9496 square miles. Population, in 1891, 6,508,800; in 1901, 6,331,856. It comprises the three districts of Gorakhpur, Basti, and Azangarh, and lies immediately south of the lower Himalayan slopes. It is intersected by numerous rivers and lakes well stocked with fish. In the north and centre dense forests abound, and the whole country presents a verdant appearance. The principal rivers are the Rapti, the Gogra, and the Great and Little Gandak. The tiger is found in the north, and many other wild animals abound. The chief productions are cotton, rice, *bajra*, *joàh*, *moth*, etc. Capital, Gorakhpur (q.v.). Gautama Buddha, the founder of Buddhism, died within the District of Gorakhpur, and it became the headquarters of the new creed. The district formed part of the territory ceded by Oudh to the British under the treaty of 1801. During the mutiny of 1857 it was lost for a short time, but under the friendly Gurkhas the rebels were driven out, and the whole district once more passed under British rule.

GORAKHPUR. A city and military cantonment, the capital of a district and division of the Northwest Provinces, British India, on the Rapti River, 100 miles northeast of Benares (Map: India, D 3). Its principal edifice is a beautiful mosque, built in the seventeenth century. The cantonment is on the west side of the city. A considerable river transit trade in grain and timber is carried on. Population, in 1891, 63,620; in 1901, 64,148.

GO′RAL (East Indian). A goat-antelope (q.v.) of the genus Cemas, inhabiting the mountain tops of Central Asia. Three species are separated by zoölogists, but those of Tibet and Mongolia are so little known that they may

GOPHERS LEMMINGS AND MARMOTS

1. POUCHED GOPHER (Geomys bursarius).
2. ALPINE MARMOT (Arctomys marmotta).
3. STRIPED GROUND SQUIRREL or GOPHER (Spermophilus tridecemlineatus).
4. LEMMING (Myodes lemmus).
5. PRAIRIE DOG (Cynomys Ludovicianus).
6. WOODCHUCK (Arctomys monax).

prove only varieties of Himalayan goral (*Cemas goral*). This antelope-like animal stands only twenty-seven inches high, and is grayish brown, with a dark stripe along the back and another down the fore leg, and a curious white ring around the eye; the forehead, nose, and tail are black. Both sexes have short black horns curving backward and ringed near the base. They wander in small bands about the edge of the highest forest, and are exceedingly vigilant and agile, so that goral-stalking is a laborious and skillful, as well as delightful pursuit for the sportsman. See SEROW, and Plate of GOAT-ANTELOPES.

GORAMI, gō′rä-mī, or **GOURAMI,** gōō′rä-mī. See GURAMAI.

GOR′BODUC. A legendary King of Britain, who is mentioned in the early chronicles, and whose tragic fate, together with that of his sons, forms the plot of the first English tragedy. The play was written by Thomas Norton and Thomas Sackville, was acted in 1561, and was printed in 1565. It has been highly praised by Sidney and Pope, but is rather too sanguinary for modern audiences. It goes by the name of its hero, who, like Lear, has divided his possessions between his two sons, Ferrex and Porrex. The sons quarrel, and one is slain; the survivor is slain by his mother, who, in turn, is killed with her husband by an indignant populace.

GORBUSCHA, gôr-bōō′shä. The humpbacked salmon (*Oncorhynchus gorbuscha*). See SALMON; HUMPBACKED SALMON.

GOR′CUM. See GORKUM.

GORDIAN KNOT (Lat. *Gordius nodus*). The traditional origin of this famous knot was as follows: Gordius, a Phrygian peasant, was once plowing in his fields, when an eagle settled on his yoke of oxen. Surprised at so wonderful a phenomenon, he sought an explanation of it, and was informed by a prophetess of Telmissus that he should offer sacrifice to Zeus. He did so, and out of gratitude for the kindness shown him married the prophetess, by whom he had a son, the famous Midas. Somewhat later, in consequence of factional quarrels, the Phrygians consulted an oracle as to the choice of a king. In reply they were ordered to choose as king whoever should come to them riding in a car. As Gordius and his family came to the assembly while the reply was under discussion, he was at once chosen king, or, according to another version, his son Midas became ruler. Gordius dedicated his car and yoke to Zeus, in the acropolis of Gordium (a city named after himself), the knot of the yoke being tied in so skillful a manner that an oracle declared whoever should unloose it would be ruler of all Asia. When Alexander the Great came to Gordium he cut the knot in two with his sword, and applied the prophecy to himself.

GOR′DIA′NUS. The name of three Roman emperors, father, son, and grandson. The first, MARCUS ANTONIUS GORDIANUS, surnamed AFRICANUS (c.158-238 A.D.), was descended on the father's side from the famous family of the Gracchi. He was remarkable for his attachment to literary pursuits. After being ædile, in which capacity he celebrated the gladiatorial sports with great magnificence, he twice filled the office of consul, first as the colleague of Caracalla, in A.D. 213, and second as the colleague of Alexander Severus. Soon afterwards he was appointed proconsul of Africa, where he gained the affections and esteem of the people, and his old age was spent in study. The tyranny and injustice of the Emperor Maximinus having at length excited a rebellion against his authority in Africa, the Imperial procurator there was murdered by a band of nobles who had formed a conspiracy against him on account of his cruelty. Gordianus, now in his eightieth year, was proclaimed Emperor, after having vainly refused the dangerous honor (March 16, A.D. 238). He received the title of Africanus, and his son was conjoined with him in the exercise of imperial authority. The Roman Senate acknowledged both, and proclaimed Maximinus, then absent in Pannonia, an enemy to his country. The younger Gordianus, however, was defeated and slain in battle by Capellianus, Governor of Numidia, before Carthage, and his father, in an agony of grief, put an end to his own existence, having been Emperor for little more than a month (April 16th). In his personal appearance Gordianus is said to have greatly resembled Augustus.—MARCUS ANTONIUS GORDIANUS (192-238), commonly called GORDIANUS PIUS, Emperor A.D. 238-244, grandson of the preceding, was raised to the dignity of Cæsar along with Pupienus Maximus and Balbinus, who were also proclaimed emperors in opposition to Maximinus; and in the same year, after all three had fallen by the hands of their own soldiers, Gordianus was elevated by the prætorian guards to the rank of Augustus. Assisted by his father-in-law, Misitheus, a man distinguished for his wisdom, virtue, and courage, whom he made prefect of the prætorians, he marched, in the year 242, into Asia, against the Persians, who, under Shahpur (Sapor), had taken possession of Mesopotamia, and had advanced into Syria. Antioch, which was threatened by them, was relieved by Gordianus, the Persians were obliged to withdraw from Syria beyond the Euphrates, and Gordianus was just about to march into their country when Misitheus died. Philip the Arabian, who succeeded Misitheus, stirred up dissatisfaction in the army against Gordianus by treachery, and finally goaded on the soldiery to assassinate the Emperor, A.D. 244.

GORDIN, gôr′dyĕn, JACOB M. (1853—). A Jewish playwright and journalist, born in the Government of Poltava, Russia. He was privately educated, and after a number of years spent in teaching began to write short stories and general articles for newspapers in Saint Petersburg and Odessa. From 1886 to 1890 he was the editor of various publications at Odessa and Yelizavetgrad. In 1879 he founded at Yelizavetgrad the Society of Spiritual Brethren of the Bible, whose aim was to reconstruct religion upon the sole basis of practical ethics, to the exclusion of all rites and ceremonies. In 1891 the society was suppressed by the Russian Government, and Gordin came to New York, where he began, almost immediately, to write for the Yiddish stage, his first play, *Siberia*, appearing in November, 1891. Within the next twelve years he had produced more than sixty plays, among them many adaptations and translations, dealing for the most part with Jewish life in Russia and America. His adaptations are such in the sense only that the general outline of their plot is borrowed; the details of the action, the character-drawing, and the underlying meaning of the play are entirely original. *Gott,*

Mensch und Teufel, one of his best plays, is the Job or Faust motive worked out in modern Jewish life, and in the same category are *Der jüdische König Lear*, *Die jüdische Sapho*, and *Kreutzer Sonata*. His plays in treatment belong to the school of robust realism, but the ethical import in them is always prominent. Others of his successful dramatic works are: *Mirela Efroth; Der wilde Mensch; Die Schechita* (The Sacrifice); *Die Schb'uo* (The Vow); *Medea; Schlome Chacham, Der russische Jude in Amerika.*

GOR'DIUS (Lat., Gordian, sc. *nodus*, knot; so called from the intricate knots into which the animals twist). The type genus of the Gordioidea, second order of Nematoda (q.v.), including those nematodes in which the body-cavity is lined by a distinct epithelium. See HAIRWORM.

GOR'DON, THE FAMILY OF. A famous Scotch family. In 1305 Sir ADAM OF GORDON was a partisan of Edward I. in his struggle for the Scottish throne. He was named joint justiciar of Lothian, and was one of the representatives of Scotland in the Parliament of Westminster. Nevertheless, he was pardoned by Robert Bruce and given the lordship of Strathbogie, where the chief seat of the family henceforth lay. His descendant, Sir ADAM, fell at the battle of Homildon Hill, in 1402, and with him the direct male line ended. The name Gordon was, however, transmitted by his two half-brothers to a wide circle of gentry in Mar, Buchan, and Strathbogie.

ELIZABETH OF GORDON, the only daughter and heiress of Sir Adam, married Alexander Seton, who afterwards was given the title of Lord Gordon. Her son ALEXANDER assumed the family name of Gordon, and was made Earl of Huntly in 1449, and Lord of Badenoch soon afterwards. By marriage he acquired large possessions in Aberdeenshire. His son GEORGE, second Earl of Huntly, married Annabella, daughter of James I., and was Chancellor of Scotland from 1498 to 1501. His son ALEXANDER commanded the left wing of the Scottish army at Flodden Field. The landed possessions of the family were greatly increased by this royal marriage, especially in Banffshire and Inverness-shire. GEORGE, fourth Earl of Huntly, acquired the earldom of Moray, and held the offices of Lieutenant of the North and Chancellor of the Realm. Alarmed at his power, the Crown deprived him of Moray. The Earl rebelled, and lost his life by a wound in 1562. His grandson GEORGE, the fifth Earl, headed the Catholic party in Scotland, and defeated at Glenlivet a royal army sent against him in 1594. Nevertheless, he obtained a pardon, and was made Marquis of Huntly. GEORGE, his successor, fought for Charles I. in the Civil War, and was beheaded at Edinburgh in 1649. His grandson, GEORGE, first Duke of Gordon (1684), held Edinburgh Castle for James II. in the Revolution of 1688. His son was the last Catholic chief of the race, while his great-grandson, LORD GEORGE GORDON (q.v.), was leader of the Gordon Riots of 1780 in London, directed against the Catholics. In 1836 the title became extinct, but it was revived in 1876 for the benefit of the Duke of Richmond.

Descendants of the first Marquis of Huntly became viscounts of Melgund and of Aboyne, and finally inherited the marquisate of Huntly, which they still hold. Other members of the family became earls of Sutherland. The lords of Lochinvar, famous in poetry and song, were Gordons. One of them, WILLIAM, sixth Viscount of Kenmure, was beheaded in 1716 for his prominent part in the Jacobite rising. In 1682 Sir GEORGE GORDON of Haddo, Lord Chancellor of Scotland, was made Earl of Aberdeen. Other members of the family were Lord Byron, whose mother was a Gordon, and Lord GEORGE GORDON, the hero of Khartum.

Consult Douglas, *The Baronage of Scotland* (Edinburgh, 1813). There are two printed family histories of the Gordons, one by W. Gordon (Edinburgh, 1726-27), the other by C. A. Gordon (Aberdeen, 1754).

GORDON, ADAM LINDSAY. See AUSTRALIAN LITERATURE.

GORDON, CHARLES GEORGE (1833-85). An English soldier, familiarly known as 'Chinese Gordon' and 'Gordon Pasha.' The son of Henry William Gordon, lieutenant-general of artillery, he was born at Woolwich, January 28, 1833. He was educated at Taunton, and entered the Royal Military Academy at Woolwich in 1848. Obtaining a lieutenant's commission in 1852, he served through the Crimean War with distinction. From 1856 to 1858 he was employed in surveying and settling the Russo-Turkish frontier in Asia, and acquired an intimate knowledge of the people and the districts he visited. He was promoted captain, 1859; in 1860 joined the Anglo-French forces in China, and was present at the capture of Peking. He remained at Tien-tsin in command of the royal engineers; he added to the geographical knowledge of China by several expeditions to the unknown interior; in 1862 became major; and in 1863 was appointed commander of the 'Ever Victorious Army,' which suppressed the formidable Tai-ping rebellion and opened up the rich provinces and cities of the silk districts. He refused the large money rewards offered him by the Chinese Emperor, who bestowed upon him the yellow jacket and peacock's feather of a mandarin of the first class, with the gold medal and title of Ti Tu, the highest Chinese military rank. In 1864 he received his brevet as lieutenant-colonel, and on his return to England was made a C.B. From 1865 to 1871 he commanded the royal engineers at Woolwich, and was distinguished for his charitable work among the sick and poor. From 1871 to 1873 he represented England in the International Danube Commission at Galatz. In 1874 he was sent by Ismail Pasha to establish the authority of Egypt in the Upper Nile basin, and was appointed Governor of the Equatorial Provinces. Subsequently he was created a pasha, and in February, 1877, the Khedive appointed him Governor of the Sudan. His administration was marked by wonderful energy and activity in establishing communication between widely separated districts; in the development of the natural resources of the country; and in suppressing rebellion and slavery. The deposition of Ismail in 1879 led to his resignation. In 1880 he accompanied the Marquis of Ripon to India as his private secretary, but, finding himself unsuited for the post, at once resigned, and on the invitation of Sir Robert Hart visited China to advise the Government in connection with its strained relations with Russia.

In 1881-82 he commanded the royal engineers

in Mauritius, where he attained the rank of major-general. From March to October, 1882, he was connected with the Cape Government in an attempt to terminate the Basuto trouble, but resigned in indignation at the intrigues of Mr. Sauer, Secretary for Native Affairs. The year 1883 he spent in a long-desired visit to the Holy Land. He had undertaken a mission to the Congo for the King of the Belgians when the catastrophe to Hicks Pasha's army, who was overwhelmed by the forces of the Mahdi, made the Gladstone Government insist on the Khedive's abandonment of the Sudan. Gordon was commissioned to effect the withdrawal of the scattered garrisons and the evacuation of the country. He arrived at Khartum in 1884 and received a warm welcome; but his first battle with the hostile Sudanese was unsuccessful, owing to the treachery of two pashas, whom he at once sentenced to death. The capture of Berber by the rebels cut Gordon's communications with Cairo, and he was beleaguered in Khartum. By vigorous personal effort he successfully repelled the besieging hordes for over ten months, but on January 26, 1885, when a tardily dispatched British army of relief, under General Wolseley, had arrived within two days' march of the place, Khartum fell through the treachery of Ferig Pasha, and the heroic commander was slain. Gordon's writings include: *Reflections in Palestine* (London, 1884); *Last Journal* (London, 1885); *Letters to His Sister* (London, 1888). Consult: Andrew Wilson, *Ever Victorious Army* (London, 1868); Hill, *Gordon in Central Africa* (London, 1881); Hake, *The Story of Chinese Gordon* (London, 1884-85); and the various *Lives* by Archibald Forbes (1884); by his brother, Sir Henry Gordon (London, 1886); Sir W. F. Butler (1889); D. Boulger (1896); and the books on the *Egyptian Sudan*, by Ohrwalder (trans. 1892) and Slatin Pasha (trans. 1896).

GORDON, Charles William (1860—). A Canadian author. He was born in the county of Glengarry, Ontario, graduated at Toronto University, and studied theology at Knox College. As a Presbyterian clergyman he went in the capacity of a missionary to the Canadian Northwest Territories, and afterwards succeeded in securing the help of Presbyterian churches in Great Britain in furtherance of Canadian missions. In 1893 he was appointed pastor of the West End Presbyterian Church at Winnipeg. His religious stories, which show deep feeling and power of vivid description, are published under the nom-de-plume of "Ralph Connor." They are: *Beyond the Marshes; Black Rock; Gwen's Canyon; The Sky Pilot; Ould Michael;* and *The Man from Glengarry.*

GORDON, George (1751-93). An English agitator whose name is connected with the 'No Popery' riots in London in 1780. He was the third son of Cosmo George, third Duke of Gordon. He was born in 1751, and at an early age entered the navy, and rose to the rank of lieutenant, but quitted the service during the American War, because Lord Sandwich refused him a ship. Elected in 1774 member of Parliament for Ludgershall, a pocket borough, he soon made himself conspicuous by his opposition to ministers and by the freedom with which he attacked all parties; but, though eccentric, he displayed considerable talent in debate and no little wit. When, in 1778, a bill passed the Parliament for the relief of Roman Catholics from certain penalties and disabilities, the Protestant Association of London, among other societies, was formed for the purpose of procuring its repeal, and in November, 1779, Gordon was elected president. In June, 1780, he headed a mob of about 100,000 persons in a procession to the House of Commons to present a petition against the measure. Riots ensued in the city, lasting for several days, in the course of which many Catholic chapels and private dwelling-houses, Newgate and other prisons, and the mansion of the Chief Justice, Lord Mansfield, were destroyed. A vivid description of the riots will be found in Dickens's *Barnaby Rudge.* Gordon was tried for high treason, but acquitted. Thereafter he seemed insane. The fanatic Protestant became a zealous convert to Judaism. In 1787 he was convicted on two official informations —for a pamphlet reflecting on the laws and criminal justice of the country, and for publishing a libel on Marie Antoinette, then Queen of France. While in prison at Newgate he died of a fever on November 1, 1793. In addition to the histories of England, consult: O'Beirne, *Considerations on the Late Disturbances, by a Consistent Whig* (London, 1780); Vincent, *A Plain and Succinct Narrative of the Riots in the Cities of London and Westminster and Borough of Southwark* (3d ed., London, 1780); Watson, *Life of Lord George Gordon* (London, 1795); Cobbett, *State Trials,* xxi.; *Annual Register* for 1780, 1784, 1787.

GORDON, George, fifth Earl of Huntly. See Huntly.

GORDON, George Angier (1853—). An American clergyman, born in Aberdeenshire, Scotland. He came to this country when but eighteen years old, and three years afterwards entered the Bangor Theological Seminary, where he graduated in 1877. He preached for one year at Temple, Maine; took a special course in Harvard College, and after his graduation in 1881 was for three years pastor of the Congregational Church of Greenwich, Conn., and in 1884 became pastor of the Old South Church in Boston. In 1893 he received the degree of doctor of divinity from Bowdoin and from Yale, and in 1895 from Harvard. His publications include: *The Witness to Immortality* (1893); *The Christ of To-Day* (1895); and *Immortality and the New Theodicy* (1897).

GORDON, George Hamilton, fourth Earl of Aberdeen. See Aberdeen.

GORDON, George Henry (1823-86). An American soldier. He was born in Charlestown, Mass., graduated at West Point in 1846, and served in the southern campaign in the Mexican War, earning the brevet of first lieutenant. In 1854 he resigned from the service, and from 1854 to 1861, after taking a course in the Harvard Law School, practiced law in Boston. On the outbreak of the Civil War in 1861 he organized and became colonel of the Second Massachusetts Volunteers. Largely in recognition of his skill and bravery in covering the retreat of General Banks's army from Strasburg to Winchester, Va., on May 24-25, 1862, he was promoted to be a brigadier-general of volunteers in June, 1862, and served as such at Cedar Mountain, Chantilly, South Mountain, and Antietam. From March

to June, 1865, he was in command of the Eastern District of Virginia, and on April 9, 1865, was brevetted major-general of volunteers. On August 24, 1865, he was mustered out of service, and subsequently until his death practiced law in Boston, where for some time he also acted as collector of internal revenue for the Seventh Massachusetts District. He published: *History of the Second Massachusetts Regiment* (1876); *History of the Campaign of the Army of Virginia Under Gen. John Pope from Cedar Mountain to Alexandria* (1880); *A War Diary of the Events of the War of the Great Rebellion, 1863-65* (1882); and *Brook Farm to Cedar Mountain, 1861-62* (1883).

GORDON, Sir James Alexander (1782-1869). An English naval officer, born in Aberdeenshire. He entered the navy at the age of eleven, served in the engagement off Lorient in June, 1795, and in the battles of Cape Saint Vincent and the Nile. In 1804 he was placed in command of the sloop *Raccoon*, subsequently participated in various actions in the West Indies, the Mediterranean, and the Adriatic, and particularly distinguished himself in the battle of Lissa, March 13, 1811, in which he commanded the frigate *Active*. In November, 1811, he lost a leg at the capture of the French frigate *La Pomone*. As commander of the *Sea Horse* he joined Sir Alexander Cochrane in the Chesapeake in the fall of 1813, and subsequently commanded the squadron which, in August, 1814, entered the Potomac, reduced Fort Washington, and captured Alexandria, after destroying or capturing the vessels in the harbor. He also took part in the futile expeditions against New Orleans in 1814-15. Subsequently he was superintendent of Plymouth Hospital for several years, was governor of Greenwich Hospital from 1853 until his death, and by successive promotions rose to the rank of admiral in 1855, and became admiral of the fleet in 1868.

GORDON, John. A Scottish soldier of fortune of the seventeenth century. He entered the Imperial Army of Ferdinand II. during the Thirty Years' War, and rose to the rank of lieutenant-colonel and commandant of Eger. Upon hearing of the defection of Wallenstein, commander-in-chief of the Imperial forces, and the determination of that general to form an alliance with the Swedes, Gordon joined in the conspiracy with Butler and Leslie for the murder of Wallenstein and his most trusted adherents. In compensation for his services he received a considerable sum from the Imperial Government. Gordon is one of the characters in Schiller's tragedy, *Wallenstein*.

GORDON, John Brown (1832-1904). An American soldier and politician. He was born in Upson County, Ga., graduated at the State University, and followed the profession of law. In 1861 he entered the Confederate Army as captain of infantry, and rose to the grade of lieutenant-general. At the time of General Lee's surrender at Appomattox, General Gordon commanded one wing of the army. In 1868 he was the Democratic candidate for Governor of Georgia, but General Meade, military commander under the Reconstruction Act, declared his opponent, Rufus B. Bullock, elected. From 1873 to 1880, and from 1891 to 1897, he was a member of the United States Senate, where he was one of the leaders of the Democratic Party, and was known as an eloquent speaker. From 1887 to 1890 he was Governor of Georgia. He became well known as a lecturer on subjects connected with the Civil War.

GORDON, Sir John Campbell, seventh Earl of Aberdeen. See Aberdeen.

GORDON, Sir John Watson- (1788-1864). A Scottish portrait painter, the son of Captain James Watson. He afterwards added the name Gordon to his family name. He was born at Edinburgh. He studied for four years under John Graham, director of the Trustees' Academy. He showed the usual desire of young artists to become an historical painter, but ultimately turned his attention to portraiture, in which he achieved a distinguished reputation. After the death of Raeburn he became the principal portrait painter in Scotland. Gordon continued to reside in his native city. He first exhibited in the Royal Scottish Academy in 1827, was elected in 1841 an associate, in 1850 an academician of the London Royal Academy, and exhibited 123 portraits there between the years 1827 and 1864. He succeeded Sir William Allan as president of the Royal Scottish Academy, and the honor of knighthood was conferred on him. Gordon excelled in transferring to the canvas those lineaments of character which are conceived to be preëminently Scotch. Among his best-known works may be mentioned: "Sir Walter Scott" (1831); "Dr. Chalmers" (1837); "Duke of Buccleuch" (1842); "Lord Cockburn" (1842); "Thomas De Quincey" (1843); "Lord Robertson" (1846); "Principal Lee" (1847); "Professor Wilson" (1851); "Earl of Aberdeen" (1852); and the "Provost of Peterhead" (1853).

GORDON, Lady Lucie (or Lucy) Austin Duff- (1821-69). An English author and translator, born in London. She was the only daughter of John Austin, the jurist. Her knowledge of German was gained during a two years' stay in Germany (1826-28). In 1840 she married Sir Alexander Duff Gordon, and almost immediately began her translations. These include: *Studies of Ancient Greek Mythology*, from the German of Niebuhr (1841); Meinhold's *Mary Schweidler, the Amber Witch* (1844); Lomping's *The French in Algiers* (1845); Feuerbach's *Remarkable Criminal Trials* (1846, with her husband); Ranke's *House of Brandenburg;* de Wailly's *Stella and Vanessa* (1850); the Countess d'Arbouville's *The Village Doctor* (1853); and Ranke's *Ferdinand and Maximilian* (1853, with her husband). At this period she lived in London, and counted among her friends Heine, Tennyson, Dickens, and Thackeray. About 1860 her health failed, and she made a voyage to the Cape of Good Hope, which her *Letters* describe (1861-62). The latter years of her life were spent in Egypt, and from there she wrote her two series of delightful letters, *Letters from Egypt* (1863) and *Last Letters from Egypt* (1865).

GORDON, Patrick (1635-99). A Scotch soldier of fortune, general in the Russian Army, and a friend of Peter the Great. He first served in Poland under Charles X. of Sweden. Captured by the Poles, he entered their service, only to rejoin the Swedes when recaptured by them at Warsaw. Next the German flag claimed his allegiance, but he soon took service again in the

Swedish and Polish armies successively. In 1661 he entered the Russian service, in which he remained until his death. The Czar Alexis sent him on a mission to England, where he had an interview with Charles II. Although raised to the rank of lieutenant-general in the Russian service, and in high favor with the boy Czar, Peter, yet on another visit to England in 1685 he greatly desired to enter the army of James II. Peter would not grant him his request, and soon afterwards promoted him to the highest rank—that of general. In the contest between Peter and his sister Sophia, which resulted in a revolution, it was chiefly through Gordon's help that Peter triumphed. His last years were spent in opulence and honor. Gordon kept a journal during the last forty years of his life, which was published at Moscow and Saint Petersburg in three volumes in 1849-53, under the title *Tagebuch des Generals Patrick Gordon zum erstenmal vollstandig veröffentlicht durch Dr. F. M. C. Posselt*, and a part of it was published in English in 1859, as *Passages from the Diary of General Patrick Gordon of Auchleuchries*.

GORDON, PATRICK (1644-1736). An English soldier and Colonial Governor in America. After serving for some years in the English Army, he was appointed Governor of Pennsylvania in 1726, and held this position until his death. A man of ability and character, he was one of the most popular of the Colonial governors of the province, and was successful for the most part in winning the confidence of the Indians, though it was during his administration in 1733 that they were virtually defrauded of part of their lands by the famous 'walking purchase.' Gordon published *Two Indian Treaties at Conestogoe* (1728).

GORDON, WILLIAM (1728-1807). An English clergyman and writer, born at Hitchin, Hertfordshire. He entered the independent ministry in 1752 at Ipswich, preached at Southwark from 1764 to 1770, emigrated to America in the latter year, settled at Roxbury, Mass., and remained in America until 1786, when he returned to England, where he subsequently held several pastorates. While in America, during the Revolutionary War, he strongly sided with the Patriot Party, and in 1788 published, in four volumes, a *History of the Rise and Independence of the United States, Including the Late War*, which for more than one hundred years was considered one of the most valuable sources for the history of the Revolution, but which has recently been shown to have been plagiarized, in large part, from the *Annual Register*, and from Ramsey's *History of the Revolution in South Carolina*, which he saw in manuscript. Consult Libby, "A Critical Examination of Gordon's History of the Revolution," in the *Report of the American Historical Association* for 1899 (Washington, 1900). He also wrote a *Treatise Concerning Religious Affections* (1762); and was a contributor to the *Protestant Dissenter's Magazine*.

GORDON-CUMMING, CONSTANCE FREDERICA (1837—). A Scotch traveler and writer, the daughter of Sir William Gordon-Cumming. She spent many years traveling in the East, and published, among other books of travel, *At Home in Fiji and New Zealand; A Lady's Cruise in a French Man-of-War Among the South Sea Islands; Granite Crags in California; Via Cornwall to Egypt; In the Himalayas* (1876); and *Five Fountains of Hawaii* (1883). She also wrote *Work for the Blind in China* (1888), which is now incorporated in *The Inventor of the Numeral Type for China* (1898), an account of the life and work of Rev. W. H. Murray of Peking.

GORDON HIGHLANDERS. See HIGHLANDERS.

GORDONIA, ·gôr-dō′nĭ-ȧ (Neo-Lat., named in honor of James Gordon, a London nurseryman of the eighteenth century). A genus of trees and shrubs of the order Ternstrœmiaceæ, of which several species are natives of America. Of these the most important is the loblolly bay (*Gordonia Lasianthus*), which is found in swamps near the seacoast from Virginia to the Gulf of Mexico. Moist tracts of considerable extent are often covered with this tree alone. It attains a height of 50 or 60 feet, has oblong, leathery, evergreen leaves, and beautiful white sweet-scented flowers more than an inch in diameter. The bark is much used for tanning. The wood is handsome, resembles mahogany, but is very perishable. In England it is cultivated with some difficulty, and generally appears as a mere bush. *Gordonia pubescens* or *Gordonia altamaha*, an American species, is of interest on account of the entire disappearance of the tree in its original habitat; it is wholly unknown in a wild state. It is said to be hardy as far north as Massachusetts, and all the specimens now growing are believed to have sprung from a single tree that long stood in Bartram's garden in Philadelphia. A number of other species of this genus are found in Eastern Asia. As ordinarily seen in cultivation, they are all shrubs. See BAY.

GORDON RIOTS. The name given to a mob uprising, directed against the Roman Catholics, which occurred in London in 1780. See GORDON, GEORGE.

GOR′DY, JOHN PANCOAST (1851—). An American educator, born in Maryland. He received an academic education and also studied at Leipzig. He was professor of education at Ohio University (Athens) from 1886 to 1896; at the Ohio State University (Columbus) from 1896 to 1900; and in 1901 was appointed to a similar chair in New York University. His most important publication is the *Political History of the United States, with Special References to the Growth of Political Parties* (vols. i. and ii., 2d revised ed. 1902).

GORE. An abatement in heraldry. It consists of two curved lines which meet in an acute angle at the centre of the escutcheon.

GORE, Mrs. CATHERINE GRACE (1799-1861). An English novelist, the daughter of a wine-merchant named Moody, and born at East Retford, Nottinghamshire. In 1823 she married Capt. Charles Arthur Gore. Her first novel was *Theresa Marchmont, or the Maid of Honor* (1824). Some of her early novels, as the *Lettre de Cachet* (1827), and the *Tuileries*, were vivid descriptions of the French Revolution; but her greatest successes were her novels of English fashionable life, conspicuous among which were: *Cecil, or the Adventures of a Coxcomb* (1841), and its sequel, *Cecil, a Peer* (1841); *The Ambassador's Wife* (1842); and *The Banker's Wife* (1843). She also wrote a prize comedy entitled *Quid pro Quo, or the Days of Dupes;* a popular

comedy called *The School for Coquettes* (1831); and several other dramatic pieces. Her novels and tales number about a hundred. Though very popular in their own time, they are now forgotten. They possess, however, great value as transcripts of contemporary fashionable society. Consult Thackeray's burlesque, "Lords and Liveries," in *Novels by Eminent Hands* (London, 1847). She died at Linwood, Lyndhurst, Hampshire.

GORE, Charles (1853—). An English theologian and prelate. He was educated at Harrow and Balliol College, Oxford, becoming a fellow of Trinity in 1875. After ordination, he held the position of vice-principal of Cuddesdon Theological College from 1880 to 1883. On the foundation in 1884 of the Pusey House at Oxford, which was intended not only to provide a home for Dr. Pusey's large theological library, but to exercise spiritual influence over undergraduates by means of a staff of clerical librarians, he was appointed its head, and remained there until 1893. Meanwhile, as editor and one of the principal contributors to the volume of essays called *Lux Mundi* (1890), he had aroused considerable distrust by the advanced and, as many thought, unsound nature of his views on the incarnate nature of Christ, especially the technical point known as the *kenosis* (q.v.); and his resignation was an obvious solution of the difficulty. He was vicar of Radley, near Oxford, 1893-94, in which period he founded a quasi-religious clerical community called the Society of the Resurrection. He was appointed canon of Westminster in 1894, and continued to exercise considerable influence by his powers as a preacher. From 1898 he was honorary chaplain to the sovereign, and in 1901 was made Bishop of Worcester. His most important works are: *The Church and the Ministry* (1889); *The Mission of the Church* (1895); *The Body of Christ* (1901), besides a strong controversial treatise called *Roman Catholic Claims* (1889), and commentaries on the Epistles to the Ephesians (1899) and to the Romans (1899).

GORE, Christopher (1758-1829). An American lawyer and politician, born in Boston, the son of a Loyalist who was banished in 1778 and restored to citizenship in 1787. He graduated at Harvard College in 1776, studied law in the office of Judge Lowell, and soon established himself as a successful lawyer in Boston. In 1789 Washington appointed him the first United States District Attorney for the State of Massachusetts. He held this office until 1796, in which year he was appointed, with William Pinckney and Jonathan Trumbull, a commissioner to England, under the Jay Treaty, to settle the American spoliation claims, and he remained in England eight years. In 1803-04 he was chargé d'affaires at London during the absence of Rufus King, the American Minister. He returned to America in 1804, and resumed the practice of his profession in Boston. He allied himself with the Federalist Party, by the leading members of which his advice was much sought. He was, in 1808, a vigorous opponent of the Embargo, and was accused by the Republicans, with Pickering and other members of the Essex Junto, of planning the secession of New England and New York from the Union, and erecting an independent confederacy under the protection of England. In 1809 he was elected by the Federalists Governor of Massachusetts. He was, however, defeated in 1810 by Elbridge Gerry. He was the unsuccessful candidate of his party again in the following year, being defeated a second time by Gerry. After several years spent in private life during a period of great political excitement, he was, in 1814, appointed to the United States Senate by Governor Strong to fill a vacancy, which appointment was confirmed by the Legislature in the following year. In 1817 he resigned from the Senate on account of ill health, and passed the remainder of his life on his large country estate at Waltham, Mass. Consult a "Memoir," in *Massachusetts Historical Society Collections*, series 3, vol. iii. (Boston, 1833).

GORE, George (1826—). An English physicist and chemist, born at Bristol. Solely by virtue of his own efforts he has made a mark as a scientist. He did not attend any educational institution after his twelfth year, but applied himself industriously to study and was able to make discoveries that secured for him an election as fellow of the Royal Society (1865), and the degree of LL.D. from the University of Edinburgh. His researches in the main have been in the departments of electro-chemistry, electro-metallurgy, and chemistry, and have been rewarded by many discoveries which are described in the leading English scientific journals. Dr. Gore was for many years lecturer on physics and chemistry at the Grammar School of King Edward VI., at Birmingham. In 1891 he was awarded a civil list pension of £150 a year in recognition of the national importance of his scientific discoveries, several of which have had widespread application in the arts. He was the author of *The Art of Scientific Discovery* (1878); *The Scientific Basis of Morality* (1882); *The Art of Electro-Metallurgy* (5th ed., 1891); *The Electrolytic Separation and Refining of Metals* (1890); and other works.

GOREBILL. A garfish. See Gar.

GORECKI, gô-rĕts'kê, Anton (1787-1861). A Polish poet, born and educated in Vilna. He took an active part in the Polish Revolution of 1830, and in consequence was obliged to flee to Paris. His complete works were published in two volumes at Leipzig in 1886. One of his best-known productions is entitled *The Death of the Traitor*.

GORÉE, gô'rā'. A small island southeast of Cape Verde, off the western coast of Africa. It is about three miles in circumference, and the larger part is occupied by the town of Gorée, once an important free port, but of little commercial importance at present. It is fortified and has a population of over 2000. The island was first in the possession of the Dutch, but has belonged to France since 1814.

GORE HOUSE. A mansion in Kensington, London, famous as a gathering place for literary men, through its two tenants, William Wilberforce and the Countess of Blessington. The former took up his residence there in 1809. Upon the site now stands the Albert Memorial.

GORGE. See Bastion.

GORGED (from OF., Fr. *gorge*, throat, from Lat. *gurges*, gulf). A term in heraldry (q.v.), applied to a lion or other animal having a collar

round its neck. The collar is generally in the form of a crown or coronet.

GORGE D'ENFER, gôrzh dän'fâr'. A locality in the valley of the Vézère, Department of Gironde, France, noted for the occurrence of stone implements and other works of prehistoric man. Near by are other famous archæological stations, including Cro-Magnon, Laugerie-Haute, Les Eyzies, and La Mouthe. Consult Mortillet, *Le préhistorique* (Paris, 1900).

GORGES, gôr'jĕs, Sir FERDINANDO (c.1566-1647). An English military officer, Governor for many years of Plymouth, England, and lord proprietary of the Province of Maine; sometimes called 'the father of English colonization in America.' He was born probably in Ashton Phillips, England, entered the army, served in Normandy in 1591, distinguished himself and was knighted at the siege of Rouen, and afterwards for many years was 'Governor of the forts and island of Plymouth.' He seems to have been engaged in the conspiracy led by the Earl of Essex, against whom he was witness in the trial of 1601. Becoming early interested in the settlement of the New World, he was one of the grantees in the royal charter of 1606, and was one of the founders of the unsuccessful Popham Colony in Maine in 1607. Capt. John Smith, as agent for Gorges, made several unsuccessful attempts to establish other settlements; and in 1616 Gorges sent out a small party which encamped for the winter on the river Saco. In 1620 Gorges and his associates obtained a new charter, which gave them title to the territory between the 40th and 48th parallels north latitude, extending westward from the Atlantic to the Pacific. Gorges and John Mason, in August, 1622, took from the Council for New England a grant of the district lying between the Merrimac and the Kennebec and extending from the Atlantic to the 'river of Canada'; and under the auspices of the former, several settlements were made. In 1629 Gorges received a grant of the so-called Territory of Laconia, as to which it was reported *non est inventa.* In 1623 Capt. Robert Gorges, son of Ferdinando, was appointed by vote of the Council for New England 'General Governor of the country.' Twelve years later, however, the council resigned the charter to the King, the elder Gorges expecting to be thereupon appointed Governor-General. Disappointed in this, he induced the King to grant him a charter constituting him lord proprietary of the Province of Maine, and providing that his office should remain hereditary in his family. His son, Thomas, was sent out as Deputy Governor. The principal settlements were Agamenticus and Saco, the former being the place now called York, which was chartered as a city in 1642 under the name of Gorgeana. In 1643 the four New England colonies formed an alliance for mutual defense, excluding therefrom the Gorges settlements. After the death of Gorges, the settlements established by him formed themselves into a body politic, and submitted to the jurisdiction of Massachusetts. Gorges wrote *A Briefe Narration of the Originall Undertakings of the Advancement of Plantations into the Parts of America, especially showing the Beginning, Progress and Continuance of That of New England* (1658), which has been much used by historians, and may be found in volume ii. of the *Maine Historical Society Collections* (Portland), and in series 3, volume vi. of the *Massachusetts Historical Society Collections.* Consult Baxter (ed.), *Sir Ferdinando Gorges and His Province of Maine* (3 vols., Boston, 1890), one of the 'Prince Society Publications.'

GORGET (OF. *gorgette, gorgète,* Fr. *gorgette,* collar, diminutive of *gorge,* throat). One of a series of surgical instruments, devised to facilitate the operation of lithotomy. Gorgets are now almost entirely out of use.

GÖRGEY, gĕr'gĕ-ī, ARTHUR (1818—). An Hungarian general in the Revolution of 1848-49. He was born at Toporez, in the county of Szepes (Zips), January 30, 1818, received a military education, and was commissioned a lieutenant of hussars. Finding garrison life monotonous, and promotion slow, Görgey left the army and took up the study of chemistry at Prague. He threw in his lot with the National Party in the rising against Austria in 1848, and was at first employed in the purchase of arms in Belgium. In August, 1848, he received an important command, and soon distinguished himself against the Croats. He exhibited great military capacity after the rout of the Hungarian army near Schwechat, in October, 1848, conducting the retreat with consummate skill. From this time he held a general command. Upon the appointment of Dembinski (q.v.) to the chief command of the Hungarian armies, Görgey showed his dissatisfaction in various ways, and it was said that his late arrival at the battle of Kâpolna prevented a great Hungarian victory. After Dembinski's resignation, Görgey was made commander-in-chief in his place, and succeeded in putting into the field an army of 40,000 men, with which he executed a brilliant advance against the Austrians. Pest was evacuated by the enemy, the siege of Komorn was raised, and before the month of April was over the Austrians had been almost driven out of Hungary. Buda, the ancient capital of the realm, well fortified and garrisoned, had still to be taken, and for this the victorious campaign was interrupted. The city was stormed May 21st, but the three weeks' delay proved fatal. Russia intervened in behalf of Austria, and Radetzky sent several regiments from his victorious army in Italy. After an unsuccessful engagement at Komorn and a battle with the Russian main army at Waitzen (July 15th), he made his way toward the upper Theiss. The Hungarians, outnumbered by the united Austrian and Russian armies, were gradually driven to the wall. Görgey, after some weeks, arrived in the neighborhood of Arad with an army decimated by continual fighting, by heavy marches, and by disease. On August 9th the army under Dembinski was vanquished in the battle of Temesvâr, and on the 10th Görgey was declared dictator by a council held in the fortress of Arad, under the presidency of Kossuth. But further resistance on the part of the Hungarians was hopeless, and on the 13th Görgey's army surrendered at Világos to General Rüdiger, the Russian commander. For this surrender Görgey was severely blamed and charged with treachery, but the facts are that on the day of surrender Görgey had only 24,000 men with 140 cannon, while five armies, with more than 200,000 men and 1000 cannon, were closing in upon him from every direction. Görgey was confined for a time at Klagenfurt, in Austria, whence he was re-

leased on parole. In 1852 he published at Leipzig *Mein Leben und Wirken in Ungarn in den Jahren 1848 und 1849*, a translation of which, *My Life and Acts in Hungary, 1848-49*, appeared in New York the same year. This was really a reply to the charge of treason to the Hungarian cause. He returned to Hungary in 1868.

GOR'GIAS (Lat., from Gk. Γοργίας), (fifth to fourth century B.C.). A celebrated Greek rhetorician. He was born at Leontini in Sicily, but spent most of his life in Greece, residing for the most part at Athens and at Larissa in Thessaly. The arrival of Gorgias at Athens as an ambassador from his native State, in B.C. 427, was fraught with important consequences for the literary life of Athens, for in him the Athenians first saw an exponent of the art of rhetoric as it had been developed in Sicily. The success of Gorgias was immediate. The Athenians thronged to hear his speeches, and it is not too much to say that the great development of oratory at Athens during the fourth century was due primarily to this Sicilian orator. Numerous teachers of rhetoric, the Sophists (q.v.), sprang up, against whose doctrine of 'form, rather than substance,' Socrates and Plato directed their teaching. In the *Gorgias* of Plato, we have an ideal dialogue between the Sicilian orator and Socrates. None of the speeches of Gorgias have come down to us, two orations, the *Palamedes* (Παλαμήδης) and the *Encomium on Helen* (Ἑλένης ἐγκώμιον), which have been handed down under his name, are probably not genuine. Consult Blass, *Die attische Beredsamkeit*, vol. i. (Leipzig, 1887).

GORGIBUS, gôr'zhē'bus'. (1) The *bon bourgeois*, father and uncle of the two silly young bluestockings whose affectations and gullibility form the plot of Molière's *Précieuses ridicules*. (2) The obstinate father of Célie in Molière's *Sganarelle*.

GOR'GO, or **GORGON** (Gk. Γοργώ, *Gorgō*, Γοργόνη, *Gorgonē*, Γοργάς, *Gorgas*, from γοργός, *gorgos*, grim). A sister of the Graæ (q.v.) and the daughter of Phorcys and Ceto. Evidences are conflicting. In Homer, Odysseus fears that Persephone may send forth against him the Gorgon's head, which is therefore regarded as belonging to the Lower World. The later legend knows Gorgo as a terrible female monster, with hideous face, hair of bronze or intertwined with serpents, mighty wings, and clad in black. Gorgo or Medusa is mortal, but her two sisters, Σθενώ, 'the Strong,' and Εὐρυάλη, 'the Far-Leaper,' are immortal. Medusa is the most terrible, and one glance from her eyes will turn any human being to stone. Though hated of the other gods, Poseidon loved her. These Gorgons lived in the far west, near the garden of the gods, and the realm of the dead. Medusa was beheaded by Perseus (q.v.), and from her trunk sprang the fruit of Poseidon's love, Chrysaor, of the golden sword, and the winged horse, Pegasus. The head, with its petrifying power, was used by Perseus against his enemies, and later taken by Athena and placed upon her ægis (q.v.). Attic legend knew of but one Gorgon, produced by Gæa to aid the giants against the gods, and slain by Athena, while the later poets explained Poseidon's love by telling of the maiden Medusa, who won the love of the god, but inspired the jealousy of Athena, who transformed her into the hideous monster and guided Perseus to her destruction. Roscher has made it very probable that the Gorgons are a personification of destructive and terrifying thunder-storms, which come with speed from the western ocean. Hence, the golden sword of the lightning, and the bearer of thunderbolts, Pegasus, spring from her dead body. Hence, too, the appearance of the Gorgoneion on the ægis of Zeus and Athena, who are armed with the thunderbolt. The head of the Gorgo was used by the Greeks for apotropæic purposes—that is, to ward off the evil eye or other evil influences. In Greek art the Gorgoneion does not appear much before the seventh century B.C. Its earliest form is certainly the hideous mask, with round face, snaky hair, huge staring eyes, and wide mouth, with projecting tongue and tusk-like teeth, which was used to keep off the evil spirits, and from which the later figure of the Gorgon develops. There was a later conception of the Gorgon as beautiful, best seen in the "Medusa Rondanini" at Munich. Consult: Roscher, *Die Gorgonen und Verwandtes* (Leipzig, 1890); Six, *De Gorgone* (Amsterdam, 1880), especially for the coin-types. Especially good is the article by Roscher and Furtwängler in Roscher's *Lexikon der griechischen und römischen Mythologie* (Leipzig, 1886-90); Glotz, in Daremberg and Saglio, *Dictionnaire des antiquités* (Paris, 1896).

GORGO'NIA'CEA (Neo-Lat., from *Gorgonia*, from Lat. *gorgonius*, relating to the Gorgon, from *Gorgo*, Gorgon; so called from hardening in the air). An order of alcyonarian corals (Octocoralla), in which the colony has a branching or fan-shaped structure. See SEA-FAN; and Plate with CORAL.

GOR'GONZO'LA. A town in North Italy, 11 miles northeast of Milan, famous for its cheese. Population of commune, in 1881, 4711; in 1901, 4895.

GOR'HAM, GEORGE CORNELIUS (1787-1857). An English theologian, who became known as the principal figure in the 'Gorham case.' He was born at Saint Neots, Huntingdonshire, was educated at Queen's College, Cambridge, received the degree of B.A. in 1808, was elected a fellow of his college in 1810, and held that appointment until 1827. Even before his ordination (1811) there, his views on baptism had caused comment, and particularly his contention that by baptism infants do not become members of Christ and the children of God: but the discussion did not become crucial until the question of his appointment to the vicarage of Brampford Speke came up before Dr. Phillpotts, Bishop of Exeter. (See GORHAM CONTROVERSY.) Gorham obtained his vicarage in 1851. He was an antiquary of some reputation, and the author of a number of pamphlets.

GORHAM CONTROVERSY. A theological controversy within the Church of England as to the teaching of this Church with reference to the sacramental grace of baptism. The occasion was a suit by the Rev. George C. Gorham against the Bishop of Exeter for induction into the vicarage of Brampford Speke, in spite of his denial of baptismal regeneration. The Arches Court of Canterbury decided in 1845 against Mr. Gorham, maintaining that baptismal regeneration is the doctrine of the Church of England, while on appeal the Judicial Committee of the Privy Council

reversed the judgment of the lower court, without, however, expressing any opinion as to the theological accuracy of Mr. Gorham's opinions. The decision and the attitude of the high dignitaries of the Church of England, amid the fierce controversy which arose in regard to it, were the main determining factors in Manning's decision to submit to the Roman obedience. Consult Purcell, *Life of Cardinal Manning* (London, 1897).

GORI, gą'rê. The capital of a district in the Russian Government of Tiflis, Caucasus, 48 miles west-northwest of Tiflis, with which it is connected by rail (Map: Russia, F 6). It is picturesquely situated at an elevation of 2000 feet, and at the foot of a mountain crowned with the ruins of the ancient fortress of Goris-Tsikhe. In one of its churches is kept an ancient icon, believed to have been presented in the sixth century to a member of the family of the Bagratides by one of the Byzantine emperors. Gardening, vine-growing, wine-making, and trading are the principal occupations. Population, in 1891, 7200; in 1897, 10,450. Founded, probably, in the seventh century.

GORI, gō'rê, Antonio Francesco (1691-1757). An Italian antiquary. He was born at Florence, where he was ordained a priest in 1717. Through the influence of Archbishop Fontanini, he was enabled to devote himself extensively to antiquarian and archæological studies. He succeeded Corsotti in the chair of history at the University of Florence, founded the *Academia Columbaria* in 1735, and continued the catalogue, begun by Assemani, of the Oriental books and manuscripts at Florence. Among his writings, which had a very considerable influence on the progress of archæological science, are: *Inscriptiones Antiquæ Græcæ et Romanæ quæ Extant in Hetruria Urbibus* (1726-44); *Monumentum Columbarium Libertorum et Servorum Liviæ Augustæ et Cæsarum* (1729); *Museum Florentinum* (1731-43); *Museum Etruscum* (3 vols., 1737-43); *Symbolæ Litterariæ* (1748-58); *Vita di Mich. Angelo Buonarotti* (1746); and *Thesaurus Diptychorum, cum Notis Passerii* (1759), probably his most valuable work.

GORILLA. The greatest of the anthropoid apes (*Gorilla Savagei*), a native of the western equatorial coast of Africa. Its name recalls a curious history. When Hanno, the Carthaginian, returned from his voyage of exploration down the west coast of Africa, about B.C. 500, he reported that he had seen hairy women whom the natives called gorillas (Gk. γορίλλαι); but as he went only to the Bight of Benin, and gorillas, so far as we know, never lived north of the Kameruns, the creatures Hanno saw, if any, were either chimpanzees, or, more probably, dog-faced baboons. The next mention of the animal is in an account printed in 1613 in *Purchas, His Pilgrims*, of the experiences of an English sailor named Battel on the Guinea Coast, in which he tells of a great ape which the natives knew by various names, and the Europeans called gorilla. Such an ape was described again by Bowdich in his *Mission from Cape Coast Castle to Ashantee* (London, 1819). Finally, in 1847, Prof. Richard Owen, of London, obtained from Dr. Savage, a missionary at the Gabun, drawings of the skull of the mysterious ape, and a few months later Professor Owen received two skulls, which he described as 'Troglodytes Savagei,' considering the animal to be of the same genus as the chimpanzee. That an American missionary, Rev. Leighton Wilson, is entitled to credit for early investigation of the animal, appears from his book, *Western Africa* (New York, 1856), in which he gives an extended account of the "recently discovered" gorilla, and says that he was "the first to call the attention of naturalists to the animal." He found a skull toward the close of 1846, and sent it to the Boston Society of Natural History, where it became the subject of immediate study and writings. Wilson's book contains much interesting information.

In 1852 a migration of these apes was made to the coast (probably due to an extraordinary failure of food in the interior, for one has never been seen there since), and several were killed whose skeletons reached both Europe and America. This new material showed such departures from the structure of the chimpanzee that a French naturalist, I. Geoffroy Saint Hilaire (consult *Comptes Rendus*, vol. xxxiv. Paris, 1852), erected for it a new genus, Gorilla, based upon such peculiarities as the great cranial ridges, the shape of the teeth, the disparity in size between the sexes, etc.; and this has received scientific approval. Owen's classic anatomical studies were in the *Transactions* of the Zoölogical Society of London for 1848, and in the *Proceedings* of the Royal Institution, for 1855, part ii.

The gorilla is not only the largest anthropoid ape, but the males are on the average larger than man himself, usually exceeding six feet in height when they stand upright. The females, however, unlike any other kind of ape, are always much smaller, usually four and one-half feet tall, nor do they have great protuberances above the orbits of the eyes, and the long, exposed canine teeth, which give their mates so ferocious an appearance. The shoulders of a male gorilla are extraordinarily broad and massive, supporting a somewhat conical head on a thick 'bull' neck, and giving attachments and leverage necessary for the powerful muscles of arms that, when they hang by his side, reach nearly to the calf of the leg. The hands are very broad, and the fingers short, thick, and united by webs nearly to the first joint. The legs are shorter in proportion than man's, have fairly developed calves, and the feet, like the hands, are broad and blunt, the toes being very large and short, and the great toe set out at an angle like a thumb; and the whole foot is nearly straight. The body is covered in most parts with long, coarse hair, blackish below but whitish at the tips, giving a brownish-gray aspect; but individuals vary greatly in color, and all grow grizzled with age. This hair becomes very long on the shoulders, back, and thighs, and on the top of the head and nape is stiff and erectile, rising like a dog's hackles when the gorilla is angry. There is a distinct beard or ruff under the chin. Beneath the outer coarse hairs grows a coat of short curly hairs, approximating to a wool. "The whole skin of the face is of a deep-black color, of a glossy appearance, and sparsely sprinkled with coarse hairs. The ears are comparatively small, with their hinder border sharply angulated in the middle, . . . and of a deep-black hue."

The gorilla is a denizen of mountainous forests, and its habitat is confined to a narrow coast region of the French Congo, extending three or four degrees north and south of the equator,

drained by the Ogove, Gabun, and upper Benito rivers—probably less than 1000 square miles of territory. This is a hilly region of comparatively open, yet damp and shady, forest, with thickets of scitamines and tree-ferns, which abounds in trees bearing fruits that ripen at various times, affording the animals food the year round; in addition to which the gorillas occasionally raid the plantations of sugar-cane, rice, etc., cultivated about the native villages.

It appears that these animals remain in the forest, and are most common in the Sierra de Cristal, between the Ogove and Muni rivers. They spend most of their time in the trees, where they move about with surprising agility, considering their bulk, and swing and leap like the huge monkeys they are. They wander during the day in search of food in family parties, consisting of two mates and offspring of various ages; but at night are wholly stationary. Several writers assert they make nests only for the lying-in of pregnant females; but Herr Koppenfels declares that each night the female plaits the branches of a tree-top into a platform, and adds to this sticks and leaves, or moss, until she has a comfortable sleeping place for herself and her young ones; and that this is sometimes returned to for three or four nights in succession, but not longer. The male is said to sleep curled up at the foot of the tree, prepared to guard his family against leopards—almost the only foe he need fear. The gorilla's food consists mainly of fruits, especially the undeveloped spathe or 'cabbage' of the oil-palm, bananas, paw-paws, several plum-like fruits, and nuts, the hardest of which, allied to the kola-nut, he cracks with a stone; but his great back teeth are well adapted to nut-cracking and to crushing tough rinds. The gorilla also eats insects, honey, birds' eggs, and fledgelings, and he is said to take flesh when he can get it, though he is not known to seek to kill other animals for the sake of eating them.

These animals are mainly arboreal, and when they go upon the ground usually walk on all fours, as their tracks constantly show, always turning the fingers of the hands under, and sometimes also the toes of the hind limbs. They walk erect with some difficulty, unless they can steady themselves by grasping something. They are shy, and even timid, usually retreating from man, and are rarely seen, even by the silent and stealthy natives of the forest, except by accident. When surprised, they run away screaming with fright; but if wounded or cornered make a terrible fight, using much the tactics of a bear, by rearing up and endeavoring to seize and pull the enemy near enough to tear it with their great teeth.

Young gorillas are occasionally captured by the negroes, and several have reached Europe, the first as early as 1860, when it was carried about Great Britain for several months, no one regarding it as anything but a chimpanzee until after its death. Since then four or five have been seen in Berlin and London; but none, in spite of the greatest care, survived more than eighteen months before succumbing to lung disease. Each of these was of a gentle, docile disposition, showing traits and an ability to learn very similar to those of the chimpanzee, eating all sorts of food, and having a childish fondness for his friends and for noise-making and amusements.

BIBLIOGRAPHY. The books already mentioned, and such general works as *Standard Natural History* (6 vols., Boston, 1885), and the *Royal Natural History* (6 vols., London, 1895), contain much of what is known of the subject. Cassell, *Natural History* (London, 1880-83), gives a very long, illustrated account, but includes much that is not verified. The best information is contained in Hartmann, *Anthropoid Apes* (New York, 1886), which also furnishes a complete comparative account of the animal's structure, and an extensive bibliography. See Plate of ANTHROPOID APES, under APE.

GORINCHEM, gō'rĕn-kĕm. See GORKUM.

GOR'ING, GEORGE, Earl of Norwich (c.1583-1663). See NORWICH, GEORGE GORING, EARL OF.

GORING, GEORGE, Lord (1608-57). An English Royalist, son of George, Earl of Norwich. (See NORWICH.) He married Lettice, daughter of the Earl of Cork, by whose influence he received a post in the Dutch service. He was wounded at Breda (1637), was appointed Governor of Portsmouth (1639), and served in both Scotch wars. He took part in the first Army plot, hoping to become lieutenant-general; but played the conspirators false as soon as he saw that his advancement was not certain. But he was never really allied with Parliament, and in 1641 had made his peace with the King. He tried to get money both from the King and from Parliament; but in the fall of 1642 declared openly for the King. A month later Portsmouth was captured, and Goring fled to Holland, and there tried to advance the King's interest. In 1643 he landed in England, and after defeating Fairfax at Seacroft Moor was captured by him at Wakefield, and sent to the Tower; but was finally exchanged. In 1644 he commanded the left wing at Marston Moor, and was in the second battle of Newbury. His intrigues against Rupert, to win himself a command and to make himself indispensable, were grave factors in the defeat of the Royalist cause. He went so far as to quarrel openly with Prince Charles's counsel when the Prince came to take command in the west. He was forced to leave the siege of Taunton to meet Fairfax, after Naseby, and was defeated by him again at Longport (1645). Goring retreated to the north, and left the Parliamentary Army without opposition. Soon after he went to France on a plea of ill health, but probably hoping to get command of an army which was being raised by the Queen. He served in the English regiments in the Netherlands, but later tried to get some help for Charles II. in Spain, and died there. He was a good officer, but famed more for flashes of ability and insight than for steadiness and application.

GÖRITZ, gē'rĭts. See GÖRZ.

GOR'KUM, GOR'CUM, or **GORINCHEM,** gō'rĕn-kĕm (Lat. *Gorcomium*). A town in the Netherlands, situated on the Merwede, 28 miles east-southeast of Rotterdam (Map: Netherlands, C 3). The town has fortified gateways of the seventeenth century, and interesting specimens of Dutch brick and tile mosaic architecture. It is famous for its salmon fisheries, and carries on a trade in grain, hemp, and cattle. The town is the terminus of the Merwede Canal to Amsterdam. Population, in 1900, 11,000.

GOR'KY, Maxim (properly Alexei Maximovitch Pyeshkoff) (1868—). A Russian author, born at Nizhni-Novgorod. In Southern and Southeastern Russia he passed from one employment to another, being at various times a shoemaker's apprentice, a gardener, a ship's cook, a baker, a porter, and a lawyer's clerk. Finally he became a tramp, and as such traveled over the greater part of Russia. Material for his subsequent literary work was derived from these experiences among the proletariat and vagabond classes, of whose life and thought he is the interpreter. His story "Makar Chudra" appeared in the *Tiflis Kavkaz* in 1892, and was followed by a rapid series of works, of which *Fomá Gordyéeff* (Eng. trans. by I. F. Hapgood, 1902; German by C. Brauner, 1901), an international success, was the most noteworthy. This volume, in its gifted style, its unrelieved tragedy, its emphasis rather upon character delineation than plot, is characteristic of Gorky's manner. Gorky's collected works appeared at Saint Petersburg in 1901 (5 vols.). German translations are accessible by Feofanoff (vols. i.-iii., Leipzig, 1901-02), Scholz (vols. i.-vi., Berlin, 1901-02), and Jakofleff and Berger (vols. i., ii., Leipzig, 1901). There is a study of Gorky in Russian, by Bozyanovsky (Saint Petersburg, 1901), and a volume of critical essays on his work by the same author, also in Russian (Saint Petersburg, 1901).

GÖRLITZ, gēr'lĭts. A town in the Prussian Province of Silesia, capital of the circle of Görlitz, situated on the Neisse, 62 miles by rail east of Dresden (Map: Prussia, F 3). It has still retained in part its old fortifications. There are extensive modern quarters. Chief among the ecclesiastical buildings of Görlitz is the large Protestant Church of Saint Peter and Saint Paul, originally built in the thirteenth century, rebuilt in the fifteenth century, and partly renovated after a fire at the end of the seventeenth. The church is a good specimen of late Gothic style, and has a fine crypt and two modern towers. Other noteworthy churches are the late Gothic Frauenkirche, dating from the fifteenth century; the Trinity, or Abbey, Church, dating from 1245 and restored in 1868; and the new Protestant Church, consecrated in 1901. The sightly Rathaus, built in the Gothic and early Renaissance styles, has a remarkable staircase and fine examples of wood-carving. A massive bastion of the fifteenth century, well worthy of attention, is now used as a guardhouse. Many fine examples of Renaissance architecture are also found among the private dwellings, and there are numerous monuments and fountains. The attractive municipal park contains statues and a botanical garden.

The administration of Görlitz is vested in a chief burgomaster, a burgomaster, a board of magistrates of seventeen, and a municipal council of sixty members. The town has a good water-supply, and is lighted by gas and electricity. Among the educational institutions, the most prominent are the two *Realgymnasien* and one classical gymnasium, the seminary for female teachers, the municipal museum of antiquities, the municipal theatre, the municipal library, containing many valuable manuscripts and incunabula, and the library of the Upper Lusatian Scientific Society, with more than 60,000 volumes, manuscripts, and collections of minerals and copper engravings. The city is well provided with benevolent institutions, as well as with art and scientific organizations. It is one of the most important industrial points of Silesia. The leading manufactures are cloth goods. There are also produced railway supplies, machinery, gold and silver wares, toys, cigars, and sausages. The retail trade is carried on to a large extent by co-operative stores. Population, in 1890, 62,135; in 1900, 80,931; mostly Protestants. The vicinity is interesting for its fine views.

Görlitz, which bears the name of a Slavic village near which it arose, was founded about 1200. It received Magdeburg rights in 1303, and joined the league of the six towns of Upper Lusatia in 1346. From 1377 to 1396 it was the capital of the Duchy of Görlitz. In 1635 it passed to Saxony, and was annexed to Prussia in 1815.

GÖRLITZ TRIAL, The. A famous trial held in 1850 at Darmstadt, Germany, and pertaining to the mysterious death of a Countess Görlitz. It was asserted that her death was due to spontaneous combustion. Liebig and Bischoff, called upon to give expert testimony in this case, declared that under no circumstances could a body in which the blood is circulating take fire. Consult Graff, "Ueber die Todesart der Gräfin Görlitz, nebst Gegenbeweis von Bischoff," in Henkes, *Zeitschrift für die Staatsarzneikunde* (1850).

GORMAN, Arthur Pue. United States Senator, born in Howard County, Maryland, March 11, 1839. At the age of 13, he became a page in the United States Senate and so continued for fourteen years. He then was appointed Collector of Internal Revenue in the Fifth District of Maryland, an office which he held from 1866 to 1869. In that year he was made general superintendent of the Chesapeake and Ohio Canal Company, and in 1872 its president, an office which he still holds. For more than thirty years he has been a conspicuous leader of the Democratic party, both in the affairs of Maryland and in those of the United States. He was elected to the House of Delegates in Maryland in 1870, and by reëlection he held the office until 1875, during the last part of his term serving as the Speaker. From 1875 to 1881 he was State Senator. He was then elected United States Senator and continued in that office until 1899. After three years of private life, he was again elected to the Senate in 1902. He led the opposition to the Force Bill in 1889, and was one of the Democratic Senators who remodeled the Wilson Tariff Bill in 1894.

GORMAN, Willis Arnold (1814-76). An American politician and soldier, born near Flemingsburg, Ky. He was educated in law at the University of Indiana, was admitted to the bar in 1825, practiced law for a number of years, served first as a major and then as a colonel in the Mexican War, commanding a battalion in the battle of Buena Vista, and for a time acted as civil and military Governor of Puebla. Subsequently, he was Democratic member of Congress from 1849 to 1853; was Territorial Governor of Minnesota from 1853 to 1857; and practiced law at Saint Paul from 1857 to 1861. On the outbreak of the Civil War, he entered the Federal Army as a colonel of Minnesota volunteers, became a brigadier-general of volunteers in September, 1861, and participated as such in the battles of Fair Oaks, South Mountain, and Antie-

tam. He left the service in 1864, and subsequently, until his death, lived at Saint Paul, where, for several years, he was city attorney.

GOR'NER GLACIER. A large glacier in the Pennine Alps, lying on the north slope of Monte Rosa. It has a length of 9.4 miles and covers an area of 26.6 square miles, including the snow-fields. The ice-sheet averages about one mile in width. A fine view of the glacier is obtained from the Gorner Grat, a ridge rising from the right bank to a height of about 10,000 feet.

GOROSTIZA, gō'rō-stē'sà, MANUEL EDUARDO DE (1789-1851). A Mexican statesman and playwright. He was born at Vera Cruz, of which city his father was Governor, and early acquired fame through his comedies, the first of which is said to have been written by him at the age of twelve. He fought against Napoleon, was one of the most active agitators of Mexican independence in London, and subsequently was sent there as Minister of the newly established Republic of Mexico. He was afterwards sent in the same capacity to the United States, and to France, where he concluded several important political and commercial treaties. A list of his works was published in the *Catálogo de Autoridades de la Lengua* of the Spanish Academy. They include: *Don Dieguito* (1820); *Indulgencia para todos* (1818); *El Jugador* (1820); *Contigo pan y cebolla* (1833).

GÖRRES, gēr'rĕs, JOHANN JOSEF (1776-1848). A German scholar and publicist. He was born at Coblenz, January 25, 1776; studied at the University of Bonn, and being of a very ardent temperament, threw himself into the revolutionary movement which then agitated Rhenish Prussia. He first dreamed of uniting the Rhenish provinces with France in pursuance of his ideal of a union of all civilized countries, and advocated these ideas in two ephemeral newspapers. He, however, soon learned to detest Napoleon, and, despairing of the cause of liberty, from 1800 to 1806 taught physics at Coblenz; then was tutor at Heidelberg. In 1808 he returned to Coblenz, and for two years (1814-16) edited another newspaper, the *Rheinischer Merkur*, the most important political journal published in Germany at that time, which breathed the most ardent German patriotism. But before long his opinions underwent another radical change, and, compelled to flee because his political views were not acceptable to the Government, he took up a mystic and symbolic kind of religion in the same enthusiastic way. Always a Roman Catholic, he now became the Church's aggressive champion. In 1826 he was appointed professor of history in the University of Munich, and the next twenty years were the most productive of his life, during which he poured forth a mass of brilliant polemic papers on questions of the day. He died at Munich, January 27, 1848. His principal publication is *Die christliche Mystik* (1836-42), which, though doubtless intended to set forth only views acceptable to the Roman Catholic Church, as a matter of fact was regarded with so much aversion that it required all the King of Bavaria's influence to prevent its being put on the Index. His numerous political writings were collected (1854-60), and also his letters (1858-74). In English have appeared: *Germany and the Revolution* (1820); *The Stigmata: a History of Various Cases* (a part of his *Mystik*, 1883). Consult his biography by Galland (2d ed., Freiburg, 1876).

GORRESIO, gōr-rā'zē-ō, GASPARE (1808-91). An Italian Sanskrit scholar, born at Bagnasco, Piedmont, and educated at Turin and Vienna. He was professor of the military school at Turin from 1832 to 1838, and then went to Paris to study Sanskrit under Burnouf, and later continued his linguistic studies in London. In 1852 the first chair of Sanskrit in Italy was established for him at Turin, and in 1862 he became librarian of the National Library in that city. His principal work, upon which he was engaged for nearly thirty years, is an excellent Italian translation of the *Râmâyana* (10 vols., 1843-58).

GORRINGE, gōr'rinj, HENRY HONEYCHURCH (1841-85). An American naval officer. He was born in the island of Tobago, W. I., the son of an English clergyman, and emigrated to New York in 1858, where he entered the merchant-marine service, and by 1862 was master of a sailing vessel. In that year he entered the United States Navy as an ordinary seaman. He was attached to the Mississippi Squadron under Commodore Porter, and in 1865, by successive promotions for bravery, attained the rank of acting lieutenant. In 1868 he was commissioned lieutenant-commander. He commanded the *Portsmouth* in the South Atlantic Squadron from 1869 to 1871, and was engaged at the Hydrographic Office in Washington from 1871 to 1876, when he was sent with the *Gettysburg* to the Mediterranean Sea. In 1879 he was assigned the task of transporting from Alexandria, Egypt, to New York the obelisk popularly known as 'Cleopatra's Needle,' which the Khedive Ismail Pasha had presented to the United States. Gorringe accomplished the task with complete success, surmounting great engineering difficulties, and showing considerable ingenuity in the contrivances he invented for moving the monolith. He resigned his commission soon afterwards in consequence of a reprimand received from the Secretary of the Navy for too free criticism of naval matters, and during the remainder of his life was engaged in extensive ship-building projects.

GORSE. See FURZE.

GORST, Sir JOHN ELDON (1835—). An English legislator, born at Preston, and educated at Cambridge. He was civil commissioner of Waikato, New Zealand, from 1861 to 1863. Three years later he was elected to Parliament for Cambridge, and from 1875 to 1892 he represented Chatham. He was appointed Solicitor General in 1885, and afterwards was successively Under-Secretary for India (1886-91); Deputy Chairman of Committees, House of Commons (1888-91); Financial Secretary to the Treasury (1891-92); rector of Glasgow University (1893-94); and vice-president of the committee of the Council on Education (since 1895). He was Plenipotentiary of Great Britain at the Labor Conference held at Berlin in 1890, and frequently exhibited a decidedly progressive spirit in dealing with matters affecting labor and education.

GORTCHAKOFF, gôr'chà-kôf'. A Russian family tracing its ancestry to Vladimir the Great and Rurik. Prince PETER GORTCHAKOFF, Governor of Smolensk, defended that town for two years (1609-11) against Sigismund III. of Po-

land, until it was taken by storm.—Prince DMITRI GORTCHAKOFF (1756-1824) was a celebrated Russian poet, and wrote odes, satires, and epistles.—Prince ALEXANDER GORTCHAKOFF (1764-1825) served under his uncle Suvaroff in Turkey and Poland, displayed great courage at the capture of Praga, a suburb of Warsaw, and was made lieutenant-general in 1798. In the campaign of 1799 he commanded under Korsakoff at Zurich. He was subsequently made Military Governor of Viborg, repulsed Marshal Lannes at Heilsberg, and commanded the right wing of the Russian army at the battle of Friedland (1807). Appointed Minister of War in 1812, he filled this post to the end of the French war, when he was made general of infantry, and member of the Imperial Council.—Prince ANDREI GORTCHAKOFF (1768-1855) served in 1799 as major-general under Suvaroff in Italy, and commanded, in 1812, a division of grenadiers at Borodino, where he was wounded. In the campaign of 1813-14 he commanded the First Corps of Russian infantry, and distinguished himself at Leipzig and Paris. He was made general of infantry in 1819, and in 1828 retired from active service.—Prince PETER GORTCHAKOFF (1790-1868) served in the campaigns of 1813 and 1814 in Caucasia under General Yermoloff. He took part in the Russo-Turkish War of 1828-29, and was one of the signers of the preliminaries to the Treaty of Adrianople. In 1843 he was appointed Governor-General of Western Siberia, and occupied that important post until 1851, when he retired from active life. On the outbreak of the Crimean War, however, he offered his services, which were accepted; and at the battle of the Alma he commanded the left wing of the Russians. He also took part in the battle of Inkerman.—Prince MIKHAIL GORTCHAKOFF (1795-1861), brother of Peter, began his military career as an officer of artillery, and distinguished himself in 1828 at the siege of Silistria and at Shumla. In 1831 he gave proofs of extraordinary valor in the battle of Ostrolenka and at the taking of Warsaw. He was appointed general of artillery in 1843, and Military Governor of Warsaw in 1846. In 1853 he commanded the Russian forces in the Danubian Provinces, crossed the Danube at Braila, March 23, 1854, occupied the frontier region of Bessarabia, and in 1855 directed the defense of Sebastopol. As a reward for his services in this unsuccessful but still brilliant defense, Prince Gortchakoff was appointed by the Emperor Alexander II. Governor of the Kingdom of Poland, and was for several years a wise and conciliatory representative of his youthful Emperor at Warsaw. He died May 30, 1861.

Prince ALEXANDER MIKHAILOVITCH GORTCHAKOFF (1798-1883), a cousin of the preceding, entered the diplomatic service and became one of the most skillful and influential diplomats in Europe. He was an attaché in the suite of Count Nesselrode at the congresses of Laibach and Verona, secretary of the Russian embassy in London in 1824, chargé d'affaires at Florence in 1829, counselor of the Russian Embassy at Vienna in 1832, and in 1841 was sent as Plenipotentiary to Stuttgart, where he negotiated the marriage of the Grand Duchess Olga, daughter of Emperor Nicholas, with Crown Prince Charles of Württemberg. He was accredited Ambassador to the German Bundestag at Frankfort in 1850, and there first met Bismarck. He represented Russia at Vienna from 1854 to 1856, and so conducted affairs that Alexander II. made him Minister of Foreign Affairs on the retirement of Nesselrode, April 15, 1856. At the very outset hostility to Austria seemed to be the impelling motive of his policy. "Austria," he declared, "is no State, only a Government," and he shaped his policy in accordance with his dictum, after the disastrous issue of the Crimean War, "La Russie ne boude pas, elle se recueille" ("Russia bears no grudge; she collects herself"). He was unquestionably successful in restoring the prestige of Russia. In 1863 he was made Chancellor of the Empire. During the Civil War in the United States he maintained a friendly attitude toward the North, a fact which restrained France and England from open countenance of the Confederacy. By bringing Russia into accord with Prussia in 1863 he was able to resist the attempted interferences of foreign powers in behalf of the Polish insurgents. He cultivated friendly relations with Bismarck while the latter was Prussian Ambassador at Saint Petersburg, and the good understanding between the two governments made possible the attainment of German unity through Prussia's drastic course, while Russia reaped her reward by being enabled to break the terms of the Peace of Paris in regard to the neutrality of the Black Sea. After 1873 Gortchakoff ceased to view with favor the much talked of alliance of the three Emperors, because of the increasing power of Germany. He was the guiding spirit of Russian policy in the war with Turkey in 1877-78, and the diplomatic consequences of that war widened the breach between the two great chancellors and their governments. Gortchakoff felt that Russia had been deserted by Germany in the negotiations at Berlin, and he never forgot it. He was the author of the Franco-Russian *entente*, to which Bismarck responded by the Triple Alliance. De Giers succeeded Gortchakoff as Minister of Foreign Affairs in 1882, but the latter remained Chancellor until his death at Baden-Baden, March 11, 1883. Prince Gortchakoff's biography, by Charles Marvin, was published in London (1887). Some interesting observations on Gortchakoff and his diplomatic methods are to be found in Bismarck's *Autobiography*, translated by Butler (New York, 1899). Consult also Klaczko, *The Two Chancellors*, translated by Tait (New York, 1876). See RUSSIA; RUSSO-TURKISH WAR.

GOR'TON. A suburban municipality of Manchester (q.v.), Lancashire, England. Population, in 1891, 15,200; in 1901, 26,550.

GORTON, SAMUEL (1600-77). An English sectary. He was born at Gorton, Lancashire, near Manchester, apprenticed to a London clothier, adopted radical religious opinions, and left for Boston in 1636. Here he became involved in disputes on religious topics, went to Plymouth, and began to preach; but he was looked upon as a heretic, required to furnish sureties for his good conduct, and went to Rhode Island. At Aquidneck (now Newport) he was publicly whipped for insulting the clergy and magistrates. He found protection at Providence with Roger Williams (1641). Thence in 1642 he went to the other side of Narragansett Bay, and bought the lands owned by the Indian chief Miantonomo at Shawomet, now Old Warwick. His claim was

disputed by other Indian chiefs, and the dispute being referred to the Boston authorities, forty soldiers were sent, who took Gorton and six of his people prisoners. They were tried at Boston on the charge of being 'damnable heretics,' and sentenced to hard labor in chains (1643). Five months afterwards (January, 1644) they were released, and driven out of the colony. Gorton then returned to England, and obtained from the Earl of Warwick an order for the land he had bought from the sachem. He returned in 1648, named the place Warwick, and thenceforward lived in peaceful possession. He preached occasionally, and filled a number of local civil offices. He was an author, and published *Simplicitie's Defense Against Seven-Headed Policy* (1646, reprinted in Peter Force, *Collection of Historical Tracts*, Washington, 1846); *An Incorruptible Key Composed of the CX. Psalm Wherewith You May Open the Rest of the Holy Scriptures* (1647); *An Antidote Against the Common Plague of the World* (1657); and other works. He died at Warwick between November 27 and December 10, 1677. A sect of which he was the founder, though few in number, existed for about one hundred years. Its distinguishing tenets were contempt for the regular clergy and the outward forms of religion, and the belief that the true believers were so united to God that they shared in His perfection, and for them Heaven and Hell were practically non-existent. Its negations led to its being called the 'Nothingarians.' Consult Gorton's biography by Sparks, *American Biography*, vol. v. (Boston, 1845).

GORTYNA (Lat., from Gk. Γόρτυνα). An ancient city of importance on the southern side of the island of Crete. It stood on the banks of the small river Lethæus (Mitropolipotamo), at a short distance from the sea, with which it communicated by means of its two harbors, Metallum and Lebena. It possessed temples of Apollo Pythius, Artemis, and Zeus. Near the town was the famous fountain of Sauros, inclosed by fruit-bearing poplars; and not far from this was another spring, overhung with an evergreen plane-tree which in popular belief marked the scene of the amours of Jupiter and Europa. Gortyna was the second city in Crete, next to Cnosus in importance. According to tradition, they combined to subdue the island, and then quarreled with each other. Neither plays a conspicuous part in the history of Greece. Under the Romans Gortyna became the metropolis of the island. Some ruins may still be traced at the modern village of Hagii Deka. An important inscription (Greek) was discovered here in 1884 by Halbherr in the bed of a mill-stream. Taken with two fragments previously discovered, and others which have come to light later, the inscription forms a practically complete code of laws, bearing on the family relations in regard to such matters as inheritance, marriage, divorce, and adoption. The inscription is written alternately from right to left and left to right (*boustrophedon*) in a peculiar local alphabet and in the local dialect. In spite of these marks of antiquity, it is not likely that the code can be dated much earlier than B.C. 400. Consult: Bücheler and Zitelmann, *Das Recht von Gortyn* (Frankfurt, 1885); Baunack, *Inschrift von Gortyn* (Leipzig, 1885); Merriam, in *American Journal of Archæology*, vols. i. and ii. (Baltimore, 1885-86), with translation and notes.

GÖRTZ, gērts, Von. See Schlitz.

GÖRUP-BESANEZ, gō'rōōp bâ-zä'nēts, Baron Eugen (1817-78). A German chemist, born at Gratz, and educated in that city and at Vienna, Padua, Munich, and Göttingen. He was appointed professor of chemistry at Erlangen in 1849. His researches on zoöchemical analysis are important; and his work entitled *Anleitung zur qualitativen und quantitativen zoöchemischen Analyse* (3d ed. 1871) is very valuable. His principal publication is the *Lehrbuch der Chemie* (vol. i., 7th ed. 1885; vol. ii., 6th ed. 1881; vol. iii., 4th ed. 1878), which has been translated into French and several other languages.

GÖRZ, gērts, or **GÖRITZ**, gē'rĭts. The capital of the Austrian Crownland of Görz and Gradisca, one of the Coast Districts; charmingly situated in a fruitful plain on the left bank of the Isonzo, about 35 miles north-northwest of Triest (Map: Austria, C 4). Among its principal buildings are the cathedral of the seventeenth century, with a beautiful sacrarium; the church and college of the Jesuits, the latter used as barracks; the archbishop's palace; and Government buildings. Above the town rises the interesting old partly ruined castle of the former counts of Görz; and to the north lies the Franciscan monastery of Castagnavizza, with the graves of Charles X. of France, who died in Görz in 1836, and of the Duc d'Angoulême and the Comte de Chambord. Görz has manufactures of silks, cotton, leather, matches, candles, paper, and soap, and a thriving trade in vegetables, candied fruits, and wine. On account of its dry mild climate and protected situation, the city has become a favorite winter resort. Population, in 1890, 21,825; in 1900, 25,432.

GÖRZ AND GRADISCA, grä-dīs'kä. A crownland and (titular) princely earldom of the Cisleithan portion of Austria-Hungary (Map: Austria, C 4). It is the most northern of the Coast Districts, being bounded on the north by Carinthia, on the east by Carniola, on the south by the Adriatic and the districts of Triest and Istria, and on the west by Italy. The area is approximately 1125 square miles. It is mostly a mountainous region. The southwestern part, on the Adriatic, is wholly arable and very fertile. In the north the Julian Alps cross in a southeasterly direction, with the Triglav group (9380 feet) rising on the eastern boundary; in the west the Venetian Alps extend southward, forming most of the western boundary, with Monte Canin (8770 feet) as the highest peak. The two important rivers are the Isonzo and the Timavo, each emptying into the Adriatic. Agriculture is the leading industry. Wine and silk are produced in the south. Wheat, barley, maize, buckwheat, and hay are the leading crops. Some rice is grown. Capital, Görz. The local diet has twenty-two members. The crownland sends five members to the Lower House of Austria. The population, in 1890, was 220,308; in 1900, 232,338. The inhabitants are almost wholly Roman Catholics. About 61 per cent. are Slovenes, and 35 per cent. Italians. The district came into the possession of Austria in 1500, on the extinction of a line of counts of Görz and Gradisca, who had ruled for some centuries.

GÖSCHEL, gē'shel, KARL FRIEDRICH (1784-1862). A German jurist and philosopher. He was born at Langensalza, and was educated for the bar at Leipzig. In 1845 he was appointed president of the consistory for the Province of Saxony, Prussia, but was compelled to resign that position after the Revolution of 1848. He was not only a profound scholar and theorist, but also a practical legislator, both in ecclesiastical and secular matters. Conservative in his religious views, Göschel exerted considerable influence upon the Protestant Church in his day, and, above all, was instrumental in establishing the relation between theology and the Hegelian philosophy. His works include: *Aphorismen über Nichtwissen und absolutes Wissen* (1829); *Der Monismus des Gedankens* (1832); *Von den Beweisen für die Unsterblichkeit der menschlichen Seele* (1835); and *Vorträge und Studien über Dante* (1863).

GOSCHEN, gō'shen, GEORGE JOACHIM (1831—). An English statesman and financier, born in 1831, and educated at Rugby and Oriel College, Oxford. Entering the mercantile firm of Frühling & Goschen, he paid especial attention to finance, and in 1856 became Director of the Bank of England. A Liberal member of Parliament for London from 1863, he took an active share in throwing open the universities to dissenters, and in bringing about the abolition of religious tests. He became a Privy Councilor and vice-president of the Board of Trade in 1865, and in the following year Chancellor of the Duchy of Lancaster and a Cabinet Minister, but retired with the Russell Ministry in June of that year. On Gladstone's accession to power in 1868, Goschen was appointed president of the Poor Law Board, and in 1871 First Lord of the Admiralty. He retired from office with his party in 1874, and in the election of this year he was the only Liberal candidate returned from the City of London. Two years later he and M. Joubert went as delegates to Cairo, where they planned with the Khedive the conversion of the Egyptian debt. In 1880 and 1881, as special ambassador to the Porte, Goschen lent his services to the settlement of the Græco-Turkish boundary. Because of his opposition to Gladstone on the extension of the franchise and on home rule for Ireland, he abandoned the Liberal party for that of the Liberal Unionists (q.v.) in 1886, and accepted the office of Chancellor of the Exchequer in Lord Salisbury's Government, under which he carried a measure for the reduction of the public debt. In 1895 he again became First Lord of the Admiralty. He was made lord rector of Aberdeen University in 1887, and of Edinburgh University in 1890. He has written largely on financial questions, and his treatise on *The Theory of the Foreign Exchanges* is a standard work.

GOS'HAWK (AS. *gōshafoc*, goose-hawk, from *gōs*, goose + *hafoc*, *heafoc*, hawk). A genus of falcons (Astur) containing five or six species, distinguished from the true falcons by a lobe or festoon, instead of a sharp tooth, on the edge of the upper mandible, and by the shortness of the wing, which reaches only to the middle of the tail. It is more closely allied to the sparrow-hawks. The species to which the name goshawk originally belonged (*Accipiter palumbarius*) is very widely diffused over Europe, Asia, and the north of Africa, chiefly inhabiting hilly and wooded regions. It is now very rare in Great Britain, particularly in England. Although one of those that were called *ignoble birds* of prey, it was much used for falconry, being easily trained, and very successful in catching such game as is confined to the ground. The goshawk was thus flown at hares, rabbits, pheasants, partridges, etc. It was also flown at geese, whence the name *goose-hawk*. It ordinarily seeks its prey by flying near the ground, and can remain a very long time on the wing. It follows its prey in a straight line, not rising in the air to descend upon it, like the falcons; and when baffled by the object of pursuit entering a wood and hiding itself in some covert, will perch on a bough, and await its reappearance with wonderful patience for many hours. Its flight is very rapid. The goshawk builds a large nest in trees. The female, much larger than the male, is about two feet in entire length.

The American goshawk (*Accipiter atricapillus*) differs from that of the Old World, being altogether a larger and handsomer hawk. The upper parts are dark bluish slate color, while underneath it is whitish, closely barred, or vermiculated with fine zigzag lines of brown. The young birds have a much less handsome plumage. The goshawk is chiefly a winter visitor in the Northern United States, but breeds in the Rocky Mountains from Colorado northward. It is the most abundant of the birds of prey in Alaska, where many remain through the winter, and subsists partly by robbing the Eskimo hunters' snares, though mainly by capturing ptarmigan for itself. See Plate of FALCONS AND FALCONRY.

GO'SHEN. The name of that part of ancient Egypt which Pharaoh is said to have presented to Jacob and his family when they came down to Egypt (Gen. xlvi. 6). Modern Bible critics consider the narrative a tradition resting upon the recollection that at one time some of the clans of the later Hebrew confederacy dwelt in Goshen; this tradition, however, while not confirmed by archæological discoveries in Egypt, may be accepted as reliable, though it is quite certain that only some of the Hebrew clans, and by no means all, sojourned in Egypt. Goshen is described as outside of Egypt proper (Gen. xlvi. 34), and "the best of the land," i.e. for a pastoral people (Gen. xlvii. 6, 11). It was on the eastern border of the Nile delta. In the priestly narrative it is designated as the land of Rameses (Gen. xlvii. 11), but according to the Egyptian inscriptions, Goshen (identical with Kesen of the inscriptions) and Rameses represent two different nomes. Naville (*The Shrine of Saft el Henneh and the Land of Goshen*, London, 1888) regards Goshen as the land which afterwards became the Arabian nome, viz. the country around Saft el Henneh east of the canal Abu-l-Unneagge, a district comprising Belbeis and Abasseh, and probably extending farther north than the Wady et-Tumilat (the valley through which the canal of the Red Sea formerly passed). Consult W. M. Müller, *Asien und Europa nach den aegyptischen Inschriften* (Leipzig, 1893).

GOSHEN. A city and the county-seat of Elkhart County, Ind., 100 miles east of Chicago, Ill.: on the Elkhart River, and on the Lake Shore and Michigan Southern and the Cleveland, Cincinnati, Chicago and Saint Louis railroads (Map: Indiana, D 1). It has important agricultural

and lumber interests, and extensive manufactures, which include flour, rubber goods, shirts, mittens, machinery, bicycles, sash and doors, veneering, furniture, woolen goods, and farm implements. There are a public library, the building having been erected at a cost of $25,000, and a handsome high-school building of stone ($65,000). Goshen is governed by a mayor, elected every two years, and a unicameral council. The water-works and electric-light plant are owned and operated by the city. Population, in 1890, 6033; in 1900, 7810.

GOSHEN. A village and the county-seat of Orange County, N. Y., 60 miles northwest of New York; on the Erie and other railroads (Map: New York, F 4). The centre of an agricultural section, it has a large trade in milk, butter, and cheese. There are cut-glass works, foundries, and a cider-mill. Goshen was settled in 1714 and first incorporated in 1809. The government, under a general act of 1897, is vested in a president and board of four trustees, who are elected at the annual corporation meeting. The village owns and operates its water-works. Population, in 1890, 2907; in 1900, 2826.

GOSLAR, gō'slär. An ancient Imperial city of Germany, in the Prussian Province of Hanover, situated on the Gose at the foot of the Rammelsberg, about 35 miles south of Brunswick (Map: Prussia, D 3). Goslar is rich in architectural remains of its former prosperity and glory. Its market square is quaint and interesting. Some of the more prominent historic structures are the Zwinger, a tower with walls 20 feet thick; the Gothic Rathaus, with a valuable collection of old books and other antiquities; the tailors' and butchers' guild-houses, dating from the fifteenth and sixteenth centuries respectively; the Romanesque twelfth-century church of the Neuwerk monastery, containing creditable paintings; the Frankenberg Church built at the beginning of the twelfth century and restored in 1880, with tombstones and sculptures; and the interesting chapel, which was formerly the vestibule of the historical Cathedral of Saint Simon and Saint Jude, founded in 1039 and destroyed in 1820. In the interior of the chapel are many relics of interest to the antiquary. The Kaiserhaus, the most ancient secular building in Germany, is a restored palace founded by Henry III. in the eleventh century. Its large Imperial hall is enriched with historical frescoes by Wislicenus, and contains an ancient Imperial throne dating from the twelfth century. The double chapel of Saint Ulrich, a portion of the original building, holds the tomb of Henry III., with his heart.

The chief industry of Goslar is mining. In the way of manufactures it produces marble articles, matches, chemicals, starch, playing-cards, and cigars. In the vicinity are situated a number of ponds from which ochre dye is obtained. The Rammelsberg Mountain (2040 feet) has been mined for centuries, produces several kinds of ores, and is a source of much interest to tourists. Population, in 1890, 13,311; in 1900, 16,403, chiefly Protestants. Goslar was founded probably early in the tenth century, and soon became important on account of its rich mineral deposits. It was a favorite place of sojourn with the Saxon and Franconian emperors, and the seat of many diets. For its adherence to the Hohenstaufen it was destroyed by Otto IV. in 1204; but it recovered its prosperity after joining the Hanseatic League. It suffered during the Thirty Years' War, and from conflagrations in 1728 and 1780. Attached to Hanover in 1816, it finally became Prussian in 1866.

GOSLAWSKI, gō-slāv'skē, MAURYCY (1802-34). A Polish poet, born in Podolia. He was educated at Kremenetz, and composed his famous war-songs as a soldier during the Revolution of 1830. These were subsequently collected and published under the title *Poezya Ulana polskiego poświęcona Polkom M. Goslawski* ("Poems of a Polish Uhlan," 1833). Sent as an emissary to Galicia from Paris, whither he had fled in 1833, he was arrested by the Russian authorities and imprisoned at Stanislau, where he died, and where a monument was erected to his memory in 1875. His complete works were published by Brockhaus in 1864 under the title of *Poezye.*

GOS'NOLD, BARTHOLOMEW (?-1607). An English navigator and one of the earliest explorers of New England. He sailed for America in 1602 with a party of colonists in the *Concord.* The expedition seems to have been supported by Sir Walter Ralegh. Gosnold made land somewhere on the coast of Maine, sailed south along the coast, and discovered and named Cape Cod, Martha's Vineyard, and Elizabeth Island. This last, now known as Cuttyhunk, was made a base for trading operations, which were carried on in Buzzard's Bay for a few weeks. The idea of a permanent settlement, to found which was one of the objects of the voyage, was soon abandoned, and in July the *Concord* was once more in England with a cargo of cedar, furs, and sassafras. In 1606—largely through Gosnold's efforts—an association of London and West of England merchants obtained a charter from James I. for colonizing Virginia. Three ships sailed under Captain Christopher Newport (1607). The expedition discovered and named Cape Charles and Cape Henry, and founded the settlement of Jamestown. Gosnold was among those appointed by the King to the council of the colony, and he was one of the many who succumbed to illness in the early months of the experiment. He died on August 22, 1607. For the contemporary account of Gosnold's voyages and the settlement of Virginia, consult Arber's edition of the *Works of John Smith,* in the Scholar's Library (London, 1884), and Stevens's reprint of Brereton, *Brief and True Relation of Gosnold's Voyage* (London, 1901).

GOSPEL (AS. *godspel, godspell,* OHG. *gotspel,* from *god,* OHG. *got,* God + *spel,* tidings; probably corrupted by popular confusion with *god, God,* from *gotspel,* good tidings, a translation of Gk. εὐαγγέλιον, *evangelion,* good tidings, from εὖ, *eu,* well + ἀγγέλλειν, *angellein,* to announce). The word used to denote (1) the message of salvation given to the world by Jesus Christ, and (2) the historical record of this message as contained in the first four books of the New Testament; so that each of these books is designated a Gospel, and the collection is known as the Gospels. The term, as used in the earlier books of the New Testament, has an active sense, best expressed by the phrase 'the preached Gospel.' This was due to the missionary character of the initial proclamation which was given by the Apostles to the message of salvation. It is frequently so used in Paul's Epistles (e.g. I. Thess. iii. 2;

Rom. i. 1-3, 9, 16; Phil. i. 5, 12; ii. 22; iv. 3). In the later books the term is used sometimes in a technical sense, denoting the historical record of this salvation message (e.g. Mark i. 1), or even the message itself as an article of faith and confession (e.g. Rev. xiv. 6). This technical sense was fully acquired by the end of the second century.

The following article naturally confines itself to the term as denoting the historical records of the Gospel message—the New Testament books commonly known as the Gospels. Of these Gospels, the first three (Matthew, Mark, Luke) cover practically the early portion of Jesus' life—i.e. His ministry in Galilee and the north—together with the close of His life in Jerusalem, recording largely the same events and reproducing largely the same teachings. For this reason they are technically known as the *Synoptic Gospels*, and the question of their literary relation to one another and to common and specific sources is known as the *Synoptic Problem*. Their origin dates within generally the same period; say from A.D. 65 to 80. The fourth Gospel (John) covers the later portion of Jesus' life—i.e. His ministry in Judæa and Jerusalem, not only on the occasion of His visits to the city during His Galilean ministry, but especially during the closing ministry in that city and region—recording events and reproducing teachings largely different from those given in the Synoptic Gospels. For this reason the literary relation of the fourth Gospel to the Synoptic Gospels constitutes in itself a specific problem known as the *Johannine Problem*, or the Problem of the Fourth Gospel. The origin of the fourth Gospel dates from a period much later than those of the Synoptists; say about A.D. 90. The discussion of these two problems has enlisted the interest of most New Testament scholars, and has really gathered around itself the most significant New Testament work which has been done in the last fifty years. More definitely stated, these problems are as follows:

I. Synoptic Problem. Our first three Gospels present such striking identities in their order of narrative, and in their use of word, phrase, and continued statement, and at the same time such striking differences in these respects, that we are compelled to ask what theory of their origin will account for these phenomena. The following theories have been propounded: (a) *The Successive Dependence Theory;* viz. that the evangelists made use of one or more of the Gospels already written, so that one of the Gospels is the first and original Gospel. A second writer used the first, and the third used one or both of his predecessors. This is the oldest view, having practically originated with Augustine, and has been worked out into every possible modification. (b) *The Documentary Theory;* viz. that all three Gospels to some extent made use of a preëxisting written source. This theory came from ideas suggested by Le Clerc (1716), and was later taken up by Priestley (1777), and finally definitely formulated by Lessing (1778). This also has received many modifications, according to the view held as to the character of the original document, and also according to the way this theory was combined with the first. (c) *The Oral Theory;* viz. that all three Gospels made use of the common oral tradition, which had become fixed by use. This was first suggested by Herder (1797) and Eckermann (1806), but fully formulated by Gieseler (1818). It has also been variously modified according as there have been held to enter into the oral sources written sources as well, or as the Gospels have been held to use each other along with the common sources, or as the common tradition has been held to have undergone various recensions which the Gospels have used in varied combinations. The conclusions most generally accepted by critics to-day lie within the general sphere of the Documentary Theory, though they involve elements of each of the others. In substance they are, that behind our present chronological Gospels lay two fundamental written sources—one a collection of the sayings of Jesus, known as the *Logia* of Matthew, and represented most conspicuously, if not exclusively, in our first and third Gospels; the other a narrative of the events of Jesus' ministry, which is practically, if not absolutely, identical with our second Gospel. Besides these main sources, it is held that the writers of the individual Gospels had access to special sources peculiar to themselves, while the writer of the third Gospel made use directly of the first as well as the second. Quite recently the theory has been advanced in Germany that the two main documents referred to above are not primary in character, but composite results of multiple sources whose origin is often, if not always, impossible to trace.

II. The Problem of the Fourth Gospel. There is such a radical difference between the discourses of Jesus as given in the Synoptic Gospels and in the fourth Gospel that we are forced to ask whether they both can have come alike from Jesus. This difference lies in the following facts: (a) The Synoptists present the discourses as simple talks on the level of every-day speech; the fourth Gospel as involved discourses beyond the range of ordinary speech. (b) The Synoptists give the discourses largely in the form of parable, as The Sower, The Lost Sheep, The Prodigal Son; the fourth Gospel gives them largely in the form of allegory, as The Water of Life, the Light of the World, The Good Shepherd. (c) In the Synoptic Gospels the subject of the discourses is, generally speaking, the varied and practical topics of religious living, as in the Sermon on the Mount; the qualities of the Christian life and character; or as in the great Parable Discourse, the nature and growth of the Kingdom of God. In the fourth Gospel to an almost exclusive extent, Jesus Himself is made the subject of the discourses, and this self-subject is treated almost wholly from the point of Jesus' transcendental relations to the Godhead. To account for these facts, the theory has been widely held that the peculiarities of the fourth Gospel discourses are due to the personal reflections of the author of the Gospel, who was not the Apostle John, but a disciple of his school, who presents in these discourses, not the actual teachings of Jesus, but the late first century, if not the post-Apostolic, theology of the Church. In recent years, however, there has been a growing tendency to account for these peculiarities as possible in the genuine teachings of Jesus, through the fact that they were delivered by Jesus in surroundings and to audiences different from those in and to which the Synoptic discourses were delivered, while they were reproduced by an apostle whose religious personality itself and spiritual intercourse with Jesus were

different from those of the apostles from whom the Synoptics may be considered to have come.

In addition to these main problems of the Gospels, there are the following minor ones:

V. THE PROBLEM OF THE CONTENTS. Involved in this problem are the following principal points of present criticism:

(a) *The Nativity.*—This is given in but two of the four Gospels—Matthew (i. 18-ii.) and Luke (i. 5-ii. 39)—and is presented by them in narratives differing largely from each other. The one in Luke is the fuller, and gives every evidence of having been derived from written Aramaic sources; the one in Matthew gives the impression of having come from oral sources. The chief question of debate is whether these sources rest upon historical fact or are the product of idealizing tradition. Against their acceptance as historical is the difficulty that during the period of the Gospel history there seems to have been no popular, nor even disciple, knowledge of them, the significance of which fact is heightened by the absence of all reference to them in the New Testament epistolary literature. In addition to this are difficulties in the narratives as they stand, particularly the lack of full harmony in their record of events, as seen in the return of the family to Nazareth; the singular agreement which they bear at points to the national Messianic expectations which were never realized, as seen in the angel announcement that the Child was to ascend the throne of David and reign over the House of Jacob forever; and the poetic elaboration of certain parts, as seen in the songs of Mary and Zacharias. Against the interpretation of the narratives as idealizations, there is the difficulty of the necessary assumption of a remarkably early date for the process. Neither Matthew nor Luke was written much, if at all, later than A.D. 75; and yet at the time of their writing this tradition was not only popularly received, but had come into the elaborated documentary form represented in Luke. Such idealization further must have been of a distinctively Gentile origin. With his high conception of the holiness of the married state, the Jew would not consider supernatural birth necessary for an ideal—in fact, did not so interpret the prophecy of the virgin birth (Isa. vii. 14); and yet, on the part of the Gentile, the crude sensuality of supernatural birth in pagan mythologies would make the creation and acceptance of such a tradition regarding Jesus within the Christian Church most difficult of accomplishment. Of the problem thus presented there may be no complete solution, though there is nothing in it which renders impossible the acceptance of the essential fact of a miraculous birth. On the contrary, the difficulty of the Gospel and Epistle silence regarding the event, and the difficulty gathering around the presence in the narratives of unfulfilled Jewish ideals, favor the historical character of the record; since, not only in proportion as the peculiar privacy of the event and the singular suspicion likely to attach to it in the popular mind are appreciated does the lack of publicity given become intelligible, but in proportion as the narratives record a form of announcement which agrees with the stage of Messianic expectations belonging to that beginning time of Gospel history, they show their primitive character, whatever poetic elaborations or harmonistic difficulties they present; while in proportion as the main idea of the supernatural conception which the narratives contain was unnatural to Jewish thought and unlikely of Gentile production, they show an element accounted for only on the assumption of actual fact.

(b) *The Lord's Supper.*—This is recorded in each of the Synoptists, all of whom agree in placing it at the time of, and in connection with, the regular Passover meal. Mark and Matthew, however, agree as against Luke at two points: (1) As to the sequence of the bread and the cup (Mark and Matthew placing the bread first, Luke placing the cup both first and last), and (2) as to the permanence intended in the observance of the meal (Luke making Jesus purpose it as a subsequent memorial of Himself, Matthew and Mark recording no such intention on Jesus' part). At the same time the Synoptists come into definite relation to the narrative of the Passion Week as given by the fourth Gospel, involving the time of the Supper and its relation to the regular Paschal meal, the fourth Gospel placing the Supper before the feast day and out of all association with the feast. In addition, account must be taken of the fact that Paul has given us, in I. Cor. xi. 23-26, a definite statement of the institution of the Supper, which, in proportion as it is earlier than the Gospel narratives could be, takes precedence of the Synoptic records. This Pauline statement agrees with Luke, and so diverges from Mark and Matthew in its distinct mention of the cup being after the Supper, and of Jesus' purpose that the observance of the meal should be a permanent one with His disciples. In fact, it is quite clear from the character of the account of Luke that, in its statement of the after cup and of Jesus' purpose, it is derived from Paul, who in his statement further diverges from all the Gospels in evidently associating together the Supper and the ordinary religious meal of the Church—the Agape—if he does not actually identify them.

The problem presented is consequently twofold: (1) Was the Supper observed before the regular Passover feast, and as a meal distinctly different from it, or at the close of the feast and as a meal definitely associated with it? and (2) was its observance intended by Jesus to be a permanent one, or to be exhausted in the event of that night? As to the first point, in case the dating of the fourth Gospel is to be taken as correct, that part of the Synoptic narrative which connects the supper with the Passover feast (Mark xiv. 12-16, and parallels, including Luke xxii. 15) must be regarded as an interpolation into the original tradition, due to the Church's early identification of the two meals, while the Supper itself must be understood as an ordinary Jewish meal, the bread and wine of which Jesus symbolically refers to Himself. In case the dating of the Synoptists is to be accepted, the fourth Gospel's chronology is to be regarded as distorted by its author, either through ignorance or for partisan reasons, and the Supper itself understood as identified in time and meaning with the regular Passover feast. In either case however, it is to be noted that all four Gospels agree in placing Jesus' death on Friday, and that the significance recorded in the Synoptists and Paul as attached by Jesus to the bread and wine of the meal is one which refers them to His death as a sacrifice. As to the second point, the fact that Luke's mention of Jesus' purpose of a

permanent observance of the Supper is practically derived from Paul confines the authority for this item in the narrative wholly to the Apostle. In regard to the worth of his testimony, it is evident, on the one hand, that the earliness of his account, in comparison with the Gospel records, gives it a relative value beyond theirs. This is confirmed by the almost necessary assumption that, even if the peculiar way in which he introduces his account (verse 23a) was not intended by him to refer his knowledge of the facts to divine revelation, it was intended to place it on a high plane of authority. On the other hand, the fact that Paul is writing to the disorderly church at Corinth, and has in mind at this particular point in his Epistle their shameful conduct of the Lord's Supper, might lead Paul to read this purpose into the narrative of the event by way of emphasizing to his readers the continual authority of the Supper. It would be manifestly unwarranted, however, to hold that such action on Paul's part disposed of the question, since the portrayal of the Supper by Mark and Matthew as, in the mind of Jesus, a covenant between Himself and His disciples, implies an intended permanence in the observance of the event, which practically involves the command, "This do in remembrance of Me," whether it was actually uttered or not. It would seem, therefore, that whatever difficulties lie in the way of a complete solution of the problem, the following essential facts are clear: That Christ, in a final supper with His disciples, symbolically referred the bread and wine of the meal to His approaching death as a sacrificial act on His part, in their partaking of which symbols they entered into a covenant realization of its benefits and recognition of its obligations.

(c) *The Resurrection.*—While none of the Gospels record the act itself, they all record the fact of the Resurrection, though in narratives which differ widely from each other. [The concluding verses of the last chapter of Mark (xvi. 9-20) are recognized as a later substitute for the ending of the Gospel, and John xxi. as a probable supplement to the original Gospel.] The most significant divergence is regarding the scene of the chief appearances of Jesus; Matthew (xxviii. 16-20) and, by implication, Mark (xvi. 7) placing it in Galilee, Luke (xxiv.) and John (xx.) in Jerusalem. The minor divergences relate to individualities in the narration of events, involved in which are some notable peculiarities, such as Matthew's reference to the accompanying natural and angelic events (xxviii. 2-4), and the gathering of the eleven at a mountain in Galilee (verses 16-20); Luke's story of the two disciples on the way to Emmaus (xxiv. 13-15), and his account of Jesus' final blessing of the disciple band and His ascension from them at Bethany (verses 50-53); John's record of the curing of Thomas's doubt (xx. 24-29). Further involved in these individualities of narration are some striking difficulties of detail, such as the statement by Luke (xxiv. 9) that the women told their experience at the sepulchre to the eleven and to all the rest, while Mark says that they said nothing to any man (xvi. 8); John's statement that Jesus forbade Mary to touch Him (xx. 17), while Matthew recounts that the women, including Mary, were allowed to clasp His feet (xxviii. 9). Apart from these divergences, however, there manifest themselves the following whole and partial agreements: (1) As to the visit of the women to the sepulchre: All the Synoptists unite in saying that they made their visit early in the morning, finding the tomb empty and returning to the city with the fact impressed upon their minds (Mark xvi. 2-4, 6; Matt. xxviii. 2, 3, 5, 6; Luke xxiv. 4-6a). John confines his account to the experience of Mary Magdalene, but states also on her part an early-morning visit, implying the finding of an empty tomb and the announcement of the fact to Peter and John, who themselves go to the sepulchre and confirm the story by their personal observation and then return to their homes (xx. 1-10; cf. Luke xxiv. 12). (2) As to the angelic appearances: All the Synoptists unite in relating a vision of angels at the tomb (Mark and Matthew one angel, Luke two), and a message from the angels, through the women, to the disciples, to the effect that Jesus was risen (Mark xvi. 5, 6; Matt. xxviii. 2, 3, 5, 6; Luke xxiv. 4-6a), Mark and Matthew adding an announcement that Jesus would meet with His disciples in Galilee (Mark xvi. 7; Matt. xxviii. 7); Luke, merely a reminder of what Jesus had said to His disciples concerning His death and resurrection while He had been with them in Galilee (xxiv. 6-8). (3) As to the appearances of Jesus Himself: (a) Matthew and John unite in relating an appearance to the women after leaving the tomb (Matthew to the group, John to Mary Magdalene). On this occasion a message is given them by Jesus Himself to His disciples (Matthew, that He would precede them into Galilee; John, that He would ascend into heaven) (Matt. xxviii. 10; John xx. 17). (b) Luke and John unite in relating an appearance to certain of His disciples during the evening of this same day, in which Jesus convinced their unbelief by displaying to them the marks of His Crucifixion; Luke adding the items of the disciples' fear at the appearance and the material proof given by Jesus of His bodily existence, together with His instruction of them in the Scriptures' reference to Himself and His word; John, the items of the appearance being accomplished in spite of closed doors, of Jesus' impartation to them of the Holy Spirit, and His recognition of them as His representatives in the world (Luke xxiv. 36-49; John xx. 19-23). In our study of the Gospel narratives, however, account must be taken of the definite statement made by Paul in his First Epistle to the Corinthians (xv. 4-8), where he gives a list of six appearances of Jesus—first to Peter, then to the twelve, then to a company of more than five hundred disciples, after that to James, then to all the Apostles, adding finally the appearance to himself. This statement, like that regarding the Lord's Supper, has priority over the earliest Gospel account, and is placed by the Apostle on a high plane of reliability of source. In view of these facts, it is significant that its only divergence from the Gospel accounts is by way of supplementation to what they narrate. From all this, then, it would seem quite possible for Jesus to have appeared to certain individuals among His disciples in Jerusalem and its neighborhood within eight days after His Resurrection; later to have appeared to larger numbers of His followers in Galilee; and finally, before His ascension, to have appeared to the Apostolic circle in Jerusalem, leading them out to Bethany, where He was parted from them.

The only question would be the time taken for the disciples' journey from Jerusalem to Galilee and return, and this is not a serious one. It would further seem quite possible for the general sequence of events, as given by all the four Gospels and by Paul, to have taken place, the order being, in brief, the visit of the women and Mary Magdalene to the Sepulchre (Mark, Matthew, Luke, John); the vision of angels to the women (Mark, Matthew, Luke); the appearance of Jesus to the women, with their report to the disciples (Matthew and Luke); Mary Magdalene's report of the empty tomb to Peter and John, and their investigation (John; see also Luke for Peter's investigation); the appearance of Jesus to Mary Magdalene (John); the appearance to Peter (Paul, Luke), to the two disciples on the way to Emmaus (Luke), to the eleven in Jerusalem (Luke, John), to the same a week later (John); the appearances in Galilee—to the eleven at the mountain (Matthew [possibly identical or synchronous with the appearance to the five hundred (Paul), before which may have been the appearance of the seven at the Sea of Galilee, recorded in the supplemental chapter of John]); then to James—most likely in Jerusalem (Paul); finally in the same city to the eleven, whom He led out to Bethany, where He ascended from them (Luke; cf. Acts i. 2, 3). As a general result, the problem presents itself, not as one of mutually exclusive records, since, admitting all the minor contradictions, the agreement among the narratives as to the essential facts is clear. The problem reduces itself in reality to the question whether the source of these narratives is more likely to have been the actual fact of the resurrection, evidenced to the disciples; or a self-persuasion of it on their part, through a desire to believe it to have occurred, though it had not. The decision between these alternatives will be determined by the inference which must inevitably be drawn from the facts (1) that the disciples did not reach their belief by any slow process of reasoning, but by an almost immediate conviction of the event, in spite of their deep despondency over Calvary; and (2) that it has been on the proclamation of this event, as the basal ground of its faith in Jesus, that Christianity has reached its stupendous results in the world.

B. The Problem of the Chronology. This concerns itself chiefly with the question as to the length of Jesus' ministry; and this question turns largely upon the character of the feast mentioned in John v. 1. If this is held to be a Passover, the duration of His active work is extended to at least three years; if it is not so held, the limit is reduced to perhaps two years. For full discussion of this and minor points, see New Testament Chronology. See also the articles on the individual Gospels.

Bibliography. In addition to the usual *New Testament Introductions* and *Lives of Christ*, which are useful for the general subject, consult the following more important recent books: (1) For the Synoptic Problem (a) as helps in investigation: Rushbrooke, *Synopticon* (London, 1880-81); Hawkins, *Horæ Synoptiæ* (Oxford, 1899); Veit, *Die synoptischen Parallelen* (Gütersloh, 1897); Huck, *Synopse der drei ersten Evangelien* (Freiburg, 1898); Heinicke, *Synopse der drei ersten kanonischen Evangelien* (Giessen, 1898). (b) For general reference and presentation of specific views: Wright, *The Composition of the Four Gospels* (London, 1890); Badham, *The Formation of the Gospels* (London, 1892); Westcott, *Introduction to the Study of the Gospels* (New York, 1896); Wernle, *Die synoptische Frage* (Freiburg, 1899); Weizsäcker, *Untersuchungen über die evangelische Geschichte* (Leipzig, 1901). (2) For the Johannine Problem: Sanday, *Authorship and Historical Character of the Fourth Gospel* (London, 1872); Luthardt, *Der Johanneische Ursprung des vierten Evangeliums* (Nuremberg, 1874; Eng. trans., Edinburgh, 1885); Beyschlag, *Zur Johanneischen Frage* (Gotha, 1876); Lightfoot, *Essays on Supernatural Religion* (London, 1889); Thoma, *Genesis des Johannis-Evangelium* (Berlin, 1882); O. Holtzman, *Johann-Evangelium* (Darmstadt, 1887); Ewald, *Das Hauptproblem der Evangelienfrage* (Leipzig, 1890); Delff, *Das Vierte Evangelium* (Husum, 1890); Watkins, *Modern Criticism in Relation to the Fourth Gospel* (London, 1890); Schürer, "Ueber den gegenwärtigen Stand der Johanneischen Frage," in *Vorträge der theologischen Konferenz zu Giessen* (Giessen, 1889); Wendt, *Das Johannis-Evangelium* (Eng. trans., London, 1902). (3) For the Nativity: Resch, *Das Kindheits-Evangelium nach Lucas und Matthäus* (Leipzig, 1897); Ramsay, *Was Christ Born at Bethlehem?* (New York, 1898); Conrady, *Die Quelle der kanonischen Kindheitsgeschichte Jesu's* (Göttingen, 1900). (4) For the Lord's Supper: Harnack, *Brod und Wasser* (Leipzig, 1892); Zahn, *Brod und Wein* (Leipzig, 1892); Jülicher, "Zur Geschichte des Abendmahls," in *Theologische Abhandlungen* (Freiburg, 1892); Spitta, *Zur Geschichte des Urchristentums*, vol. i. (Göttingen, 1893); Gardner, *The Origin of the Lord's Supper* (London, 1893); Schaefer, *Das Herrenmahl* (Gütersloh, 1897). (5) For the Resurrection: Milligan, *The Resurrection of Our Lord* (London, 1884); Loofs, *Die Auferstehungsberichte* (Leipzig, 1898).

GOSPEL. In the liturgical sense, the short selection from the Gospels which is read or sung in the mass and in the Anglican communion service between the epistle and the creed. It formed a regular part of the service as early as the second century. For two hundred years the reading was continuous, taken up each day where the previous one had stopped; but when the calendar was fully developed under Pope Damasus the selections were chosen to correspond with it. The liturgical gospels were not originally included in the same book with the rest of the service, which allowed special ceremonial veneration to be paid to the book containing them. Thus in the fifth century it was brought in solemn procession, and laid upon the altar at the beginning of the service; a relic of this practice is the present custom of having the deacon deposit it for a while upon the altar immediately before singing the gospel. The bearing of lights in connection with it was known to Saint Jerome, and signifies the illumination of the world by the Gospel message. The reading is prefaced by the response *Gloria tibi, Domine* ("Glory be to thee, O Lord!"), and followed by *Laus tibi, Christe* ("Praise be to thee, O Christ!"), after which the book is kissed by the celebrant. All present have always stood during the reading with uncovered heads, even kings laying aside their crowns. The recitation of the 'last Gospel' (commonly the first fourteen verses of John, un-

less commemoration is made of a superseded office by the use of its Gospel) is of later introduction. In the thirteenth century the priest recited it on the way to the sacristy, as the bishop does today on the way from the altar to his throne. Pius V. in his revised missal gave it its present place. See MASS; EPISTLE.

GOSPELER. A name applied to the minister in the Church of England who reads the Gospel in the communion service, analogous to the deacon in the mass. (See EPISTOLER.) It was also used as a nickname for Wiclif and his followers when they devoted themselves to the circulation of the Scriptures in the vernacular.

GOS'PORT. A fortified seaport and market-town in Hampshire, England, on Portsmouth Harbor (the English Channel), directly opposite Portsmouth (Map: England, E 6). It is the chief manufacturing seat and depot of stores for the equipment of the British Navy. The inhabitants are mostly engaged in Government establishments, which comprise powder-magazines, fusee and rocket laboratories, and the Royal Clarence Victualling Yard, with its various important departments. Among the industries are the manufacturing of anchors and chain cables, yacht-building, and sail-making. The town is inclosed within ramparts with an outer circle of forts, which merge in the continuous barrier that surrounds Portsea and Portsmouth. On the southeast is Haslar Hospital, the celebrated national institution for disabled sailors. Bishop Henry de Blois is said to have bestowed the name of God's port—hence Gosport—when he found safety here during a storm in 1158. The large suburban district of Alverstoke is included in the census of Gosport. Population, in 1891, 25,400; in 1901, 28,900.

GOSS, Sir JOHN (1800-80). An English musical composer. He was born in Fareham, Hampshire, and at ten years of age was a chorister in the Chapel Royal, while at twenty-seven he was professor of harmony at the Royal Academy of Music. By that time he had written a number of part-songs, sacred and secular, but it was not until he became organist of Saint Paul's Cathedral (1838) that he began to be famous as a composer. Besides writing a number of original anthems, he edited chants and cathedral services by ancient and modern composers, wrote the beautiful *If We Believe that Jesus Died* for the funeral of the Duke of Wellington and a *Te Deum* and anthem for the Thanksgiving service on the restoration to health of the Prince of Wales (1872). That year he retired and was knighted. His popularity with his pupils and fellow-musicians is witnessed by the tablet to his memory in the crypt of Saint Paul's.

GOSSAERT, gōs'särt, JAN. See MABUSE, JAN.

GOSSAMER (ME. *gossomer, gosesomer*, goose-summer, from *gos*, goose + *somer*, summer; so called on account of the downy appearance, and the time of coming). A light filamentous substance, which often fills the atmosphere to a remarkable degree during fine weather in autumn, or is spread over the ground, stretching from leaf to leaf and from plant to plant, loaded with dewdrops, which glisten and sparkle in the sunshine. It is produced by small spiders of many species, and is said to be produced by young and not by mature spiders, a circumstance which, if placed beyond doubt, would help to account for its appearance at a particular season of the year. The threads of gossamer are so delicate that a single one cannot be seen unless the sun shines on it; but being driven about by the wind, they are often beaten together into thicker threads and flakes. They are often to be felt on the face when they are scarcely visible. The spiders which produce these threads shoot them out from their spinnerets, a viscid fluid being ejected with great force, which becomes a thread; sometimes several such threads are produced at once in a radiating form, and these, being caught by the ascending current of heated air, are borne up, and the spider along with them. See SPIDER.

GOSSE, EDMUND WILLIAM (1849—). An English author. He was born in London, September 21, 1849, the son of Philip Gosse, the naturalist. Though he did not have the advantage of a university education, he has received, in recognition of his services to letters, the degree M.A. (1885) from Cambridge, and the degree LL.D. (1899) from Saint Andrews. In 1867 he was appointed assistant librarian in the British Museum; in 1875, translator to the Board of Trade; and in 1884, Clark lecturer in English literature at Trinity College, Cambridge. In 1884 he visited the United States, lecturing at Harvard, Yale, Johns Hopkins, and other colleges. He is distinguished both as poet and as critic, his chief works being *Madrigals, Songs, and Sonnets* (1870); *On Viol and Flute* (1873); *Northern Studies* (essays on Scandinavian literature, 1879); *Thomas Gray* (1882); *Seventeenth Century Studies* (1883); *Congreve* (1888); *History of Eighteenth Century Literature* (1889); *The Secret of Narcisse* (1892); *In Russet and Silver* (1894); *The Jacobean Poets* (1894); *Critical Kit-Kats* (1896); *Short History of English Literature* (1897); *Life and Letters of Dr. John Donne* (1899); and *An Illustrated History of English Literature*, in collaboration with Garnett (1902).

GOSSE, NICOLAS LOUIS FRANÇOIS (1787-1878). A French historical painter, born in Paris, where he studied at the Ecole des Beaux-Arts and under Vincent, and became a skilled representative of the academic style prevailing in his earlier period. His principal works include: "Napoleon I. and Queen Louise at Tilsit," "Meeting of Napoleon and Alexander of Russia at Erfurt," and "Louis Philippe Declining the Crown of Belgium Offered to His Son," all in the Historical Museum at Versailles; and "Entry of the Duke of Angoulême into Madrid," a wall painting in the Hôtel de Ville, Paris.

GOSSE, PHILIP HENRY (1810-88). An English naturalist, born at Worcester, England. From 1827 to 1835 he lived in Newfoundland as a merchant, from 1835 to 1838 in Canada as a farmer, and from 1838 to 1839 in Alabama as a teacher. In 1844 he visited Jamaica to study the birds there. He was an accurate observer of animal life, and a voluminous and most agreeable writer. In 1856 he was made F.R.S. Gosse did a great work in advancing and popularizing marine zoölogy, and the influence he exerted was widespread and lasting. Among his publications are: *The Canadian Naturalist* (1840); *Birds of Jamaica* (1851); *Natural History* (1848-51); *Marine Zoölogy* (1856); *Evenings with the Microscope* (1859); *Letters from Alabama* (1859).

GOSSEC, gō'sēk', François-Joseph (1733-1829). A French composer, born at Vergnies in Hainaut. He was a choir boy in the Antwerp Cathedral, and then went to Paris, where, through the influence of Rameau, he was employed by a rich amateur, La Popelinière, to direct his private orchestra. Gossec has been called 'the father of the symphony in France.' He found all instrumental music neglected, and made it his ambition to revivify it. His first symphonies were published in 1754, five years before Haydn wrote his. While orchestra conductor to the Prince of Conti, he wrote several operas. To him belongs the honor of having started the Ecole Royale de Chant (1734), which was the prototype of the Conservatory, and when that institution itself was founded (1795), he was one of the three inspectors, the others being Méhul and Cherubini. During the Revolution he was the conductor of the band of the Garde Nationale, and composed a good deal of national music for fêtes. A critic sums up Gossec as "not one of those geniuses who defy time," and he had the misfortune to see his ideas improved upon by some of his contemporaries; but his influence on the development of instrumental music in France can hardly be overestimated. His works include: *Le faux lord* (1764); *Les pêcheurs* (1766); *Alexis et Daphné* (1775); *Philémon et Baucis* (1775); *La fête du village* (1778); *Thésée* (1782); *Rosine* (1786); *Chant du 14-Juillet, Hymne à l'humanité; Hymne à l'Etre suprême; Chœurs et chants pour l'apothéose de Voltaire et de Rousseau;* some oratorios and a good deal of instrumental music. Consult Gregoir, *Notice biographique sur F. J. Gossé dit Gossec* (1878).

GOSSELIN, gō'slăn', Charles (1834-92). A French landscape painter, born in Paris. He studied with Busson and Gleyre, and in 1882 was appointed custodian of the Museum at Versailles. His principal paintings, embracing largely woodland scenes, include: "Woods in Autumn" (1863); "Environs of Bougival" (1866); "Twilight in the Woods" (1868); "December Landscape" (1879); "Between Dieppe and Tourville" (1884). In all these pictures he reveals his power to deal with large masses effectively.

GOSSELIN, Pascal François Joseph (1751-1830). A French archæologist, born at Lille, France. After acting as a Deputy to the National Assembly (1789), he became a member of the central administration of commerce (1791), and was employed in making maps for the War Department (1794). He was employed by Napoleon to assist in the translation of Strabo; was one of the chief editors of the *Journal des Savants* after 1816, and published, among other works, *Géographie des Grecs analysée* (1790), and *Recherches sur la géographie systématique et positive des anciens* (1798-1813).

GOSSLER, gōs'lēr, Gustav von (1838-1902). A Prussian statesman, born at Naumburg. He studied at Berlin, Heidelberg, and Königsberg, and, after having held a number of Government posts, was an assistant in the Ministry of the Interior from 1874 to 1878, and in 1879 was appointed Under-Secretary of State in the Ministry of Ecclesiastical Affairs and Public Instruction. In 1881 he succeeded Puttkamer in the Ministry. The troubles attending the Kulturkampf were still active, and these he endeavored to meet by a practical scheme of informal concession to the Roman Church. Thus, he did away with several provisions of the so-called 'May Laws,' such, for example, as the examination of the clergy and appointment of priests by the State. Other measures of conciliation were also devised by him, sometimes not without the opposition of the Prussian Government. He very vigorously opposed the Polish nationalistic movement in Posen, and in 1887 struck a decisive blow by abolishing instruction in the Polish language in the public schools. In 1890 he formulated a school law which gave offense to the Poles, and of whose immediate passage there was little hope, since the Government at that time required Polish assistance in the Reichstag in support of its commercial projects. He therefore resigned in 1891, and soon afterwards was appointed Lord Lieutenant of West Prussia. Consult his *Ansprachen und Reden* (Berlin, 1890).

GOSSNER, gōs'nēr, Johannes Evangelista (1773-1858). Founder of the Gossner Foreign Missionary Society. He was born at Hausen, near Augsburg, December 14, 1773, educated at Dillingen and Ingolstadt, and from 1796 to 1826 served in the ministry of the Roman Catholic Church. During 1820-24 he was preacher in Saint Petersburg. As early as 1802 he was suspected of leanings toward Protestantism, and in 1826 he openly joined the Evangelical Church. From 1829 till 1846 he preached in Berlin, and labored zealously for missions, education, and philanthropic undertakings. He became a director of the Berlin Missionary Society when it was founded in 1831, but left it in 1836 because he wished missionaries to have greater liberty of action. Assisted by voluntary contribution, he continued to send forth missionaries, and in 1842 his missionary society was formally organized. It still exists, and labors chiefly in the East Indies. Gossner died March 30, 1858. Among other works he published: *Geist des Lebens und der Lehre Jesu* (1823); *Die Heiligen Schriften des Neuen Testaments mit Erklärungen und Betrachtungen* (new ed. 1888-94). Consult his life by Dalton (Berlin, 1898).

GOS'SON, Stephen (1555-1624). An English author, born in Kent. Entering Corpus Christi College, Oxford, he was graduated B.A. in 1576, and wrote several plays, of which none are extant. Later he attacked the stage violently, and took orders. In his *School of Abuse* (1579; reprinted by E. A. Arber, 1868), he began a lively controversy on the stage, which led to many pamphlets, and ultimately to Sidney's *Apology for Poetry* (1595).

GOSSYP'IUM. See Cotton.

GOSZCZYŃSKI, gōsh-chun'skē, Seweryn (1803-76). A Polish poet, born in the Government of Kiev, Russia. He was educated at Warsaw, and was one of the foremost leaders of the Revolution of 1830. He was one of the band of fugitives who subsequently assembled in Paris, and they exercised a very powerful influence upon him. His works are lyrical in character, and many of them are devoted to a description of life in the Carpathians and in the Ukraine. Most of them are characterized by a vein of sadness due, probably, to the political conditions which have weighed so heavily upon the patriotic poets and authors of Poland. His principal poetic productions include: *Zamek Kaniowski* (translated into

German and French); *Król Zamczyska* (1847); *Oda Powieść z czasow Bolesława Chrobrego* (1852); and *Posłanie do Polski* (1869). He also prepared an excellent translation of Ossian.

GOT, gō, François Edmond (1822-1901). An actor of the Comédie Française, where he made his appearance in 1844. He was born at Ligne-rolles (Orne), and educated at the Lycée Charlemagne. After a short time spent as a Government clerk he entered the Conservatoire in 1841, where in the two following years he carried off successively the second and first prizes. He was elected a member of the company at the Théâtre Français six years after his début, while he speedily rose to the first rank as a comic actor. His subsequent career was spent chiefly at the 'House of Molière,' but in 1866 by special arrangement he played in Emile Augier's *Contagion* at the Odéon, and afterwards 'starred' in this piece in various provincial cities. One of his most popular creations was Giboyer in *Les effrontés*, and *Le fils de Giboyer*, a part to which he devoted himself for two years. M. Got was the author of the libretto of *François Villon*, which was rendered at the Opéra in 1857, and of *L'Esclave* (1874). His golden jubilee at the Théâtre Français was celebrated in 1894, and he made his farewell appearance in 1895. He died in Passy.

GÖTA-ELF, yē'tȧ-ĕlf (*elf*, Dano-Norwegian *elv*, river). The outlet of Lake Vener (q.v.), in Sweden, forming with its upper course, the Klar-Elf, the largest river system of the Scandinavian peninsula. The Klar-Elf rises among the Kjölen Mountains a short distance from the Norwegian boundary, and on the boundary between Svearike and Norrland, and flows southeast as a violent mountain torrent, first through a part of Norway, where it is called the Fämund-Elv, and then through the Swedish Län of Vermland, where it empties into Lake Venern at Karlstad. Leaving Lake Venern at its southwestern corner, the Göta-Elf proper flows in a southwest direction, and empties by two arms into the Cattegat at the city of Göteborg. The length of the Göta-Elf is 68 miles, but the whole length of the river, including the Klar-Elf, is 440 miles. The river forms a number of falls or rapids, of which the famous Trollhätta (witch's cap) in the Göta-Elf proper, a few miles below Venern, is the largest, and is one of the most picturesque rapids in the world. Navigation has been made possible past the Trollhätta by means of a canal, which through Lake Venern connects with the Göta Canal, constructed in 1810-32 at a cost of over 15,000,000 kroner, and which opens up a continuous waterway by way of Lake Vettern from the Cattegat to the Baltic Sea through the heart of Sweden.

GŌTAMA, gō'tȧ-mȧ. An early Hindu philosopher and logician. He is the reputed author of the *Nyāya-Sūtras*, or aphorisms of logic, which form the basis of the Nyaya system of philosophy (q.v.). The date of Gotama is quite uncertain; Western scholars tend to place his founding of the Nyaya system after rather than before the Christian Era; but the Hindu view inclines to make Gotama as old as the fourth century B.C. With such problems are connected also the discussion started by Sir William Jones, who attributed the development of the syllogism by Aristotle to the influence of Gotama's writings upon Greece. This view is strongly controverted by other scholars, who seek to maintain the reverse of this proposition. As an appellative Gotama is a very old name in India; one of the Vedic seers was called Gotama and bore the patronymic Rahugana. From Gotama descended the family of the Gautamas. Buddha also was known as Gautama Buddha (q.v.), or in the Pali form as Gotama Buddha.

GÖTARIKE, yē'tȧ-rē'*ke*, or **GOTHLAND** (Swed., Kingdom of the Goths). One of the three historical divisions of Sweden, occupying the southern part of the country and divided into 12 läns. Its total area is 35,783 square miles, and its population, in 1890, was 2,595,236; in 1900, 2,696,233.

GÖTEBORG, yē'te-bôr-y', **GOTHENBURG,** or **GOTTENBURG.** Capital of the Län of Göteborg and Bohus, and, next to Stockholm, the most important city of Sweden, situated on the river Göta, four miles from its mouth (Map: Sweden, E 8). The town is semicircular in form, and lies in a plain surrounded by hills. The newer sections are built on the hills; the lower portion along the river has broad streets, partly formed by canals, and lined with trees. In the centre of the town are the Gustav Adolfs Torg, or market-place, containing a statue of Gustavus Adolphus; the exchange; and the town hall. Other noteworthy buildings are the cathedral, the Governor's palace, and the arsenal. The educational facilities of the town comprise a gymnasium; technical, commercial, and nautical schools; a municipal library of 100,000 volumes; a museum with fine archæological, zoölogical, and industrial collections; and a scientific society, founded in 1778. The system of protection against fire, and the water-supply, are good; the streets are lighted by gas and electricity. Street railways and omnibuses traverse the town.

Cotton-spinning and ship-building, iron and steel milling are among the manufacturing industries. Other important products are sugar, porter, paper, sailcloth and leather; the town stands preëminent in Sweden on account of its commerce. Its harbor, recently enlarged, is rarely blocked by ice, and affords a shelter for a large number of vessels from all parts of the world. The largest exports are pig and wrought iron, steel, zinc, manganese, lumber, matches, oats, fish, and pork. Among the imports are sugar, coffee, grain, cotton and cotton goods, and coal. Göteborg receives about one-fourth of the total foreign commerce of Sweden. The United States is represented by a consul. Population, in 1840, 26,084; in 1890, 104,657; in 1900, 130,619. Göteborg was founded on its present site in 1619 by Gustavus Adolphus.

GOTHA, gō'tȧ. The capital of the Duchy of Gotha and the second residence of the dukes of Saxe-Coburg-Gotha, situated on the Leina Canal, 17 miles by rail southwest of Erfurt (Map: Germany, D 3). Gotha is a well-built, pleasant city, near the northern edge of the Thuringian Forest. It is composed of the old town and four modern suburbs separated from it by promenades. The finest building is the Ducal Palace of Friedenstein, situated on an eminence south of the old town. It is an extensive building, with two massive towers, erected in 1643 by Ernest the Pious. It is surrounded by promenades and a park, and contains a library

of 200,000 volumes, as well as 7000 manuscripts, including many in Arabic, and one of the best collections of coins in Germany. The public park is worthy of note.

The well-known museum was constructed in an ornate Renaissance style in 1864-77. It contains an extensive collection of ancient pottery, gold, ornaments, weapons, embroideries; an ethnographical collection; a splendid gallery of paintings, rich in old masters; a collection of sculptures, engravings, and casts; a natural-history cabinet; and a variety of miscellaneous treasures. Other noteworthy buildings are the fine sixteenth-century Renaissance Rathaus, the Augustinian Church with a large altarpiece, the theatre, and the Friedrichsthal Palace (now occupied by the Government offices), the Masonic lodge, and the post-office.

The town is governed by an over-burgomaster, a burgomaster, five senators, and 24 councilmen. It is lighted by electricity, and has an electric street railway. Educational and benevolent institutions are numerous, including art and medical schools. There are also many active unions and associations, scientific, historical, etc. The city is an important centre in the publishing and art trade of Germany. The famous *Almanach de Gotha* and *Petermann's Mitteilungen* are published here, being issued by the firm of Justhus Perthes, the foremost geographical establishment in Germany. Industrially and commercially, Gotha is one of the most important cities of Thuringia. The chief products are porcelain ware, meat, footwear, tobacco, machinery, soap, woolens, stoves, and brick. There are also large railway repair-shops, and numerous engraving establishments. Population, in 1890, 28,134; in 1900, 34,651, composed almost exclusively of Protestants.

Gotha probably was a village at the time of Charlemagne. It is first mentioned as a town at the beginning of the twelfth century, when it belonged to the landgraves of Thuringia. In 1440 it passed to the electors of Saxony. In the partition of the Saxon dominions in 1485 it became part of the possessions of the Ernestine line, and since 1640 has been the capital of the Duchy of Gotha. See SAXE-COBURG-GOTHA.

GOTHA, ALMANACH DE. A universal political register, printed in German from 1764 to 1804, in French from 1805 to 1871, and since in both languages. It is a royal and aristocratic genealogy for Europe, and a diplomatic, governmental, and statistical record for the world, edited with a care and inclusiveness that has given it authority all over the world. It derives its name from its place of publication.

GOTHA, DUCHY OF. See SAXE-COBURG-GOTHA.

GOTHAM, gō'tham. A parish in Nottinghamshire, England, the name of which is suggestive of simple or foolish people. Tradition states that King John proposed making a progress through the town with the intention of purchasing a castle, but the people, averse to the expense of maintaining royalty, turned him away by engaging in idiotic pursuits. Gotham, however, is only one of the many European localities to which a similar tradition is applied. Irving in his *History of New York* applied the name to New Amsterdam. Consult Cunningham, *Amusing Prose Chap-book* (Glasgow, 1888).

GOTHAM ELECTION, A. A farce by Mrs. Centlivre, published in 1715, but never acted. It was a satire on the Tories, and was dedicated to Secretary Craggs, who, it is said, sent the author twenty guineas in recognition of the courtesy. In 1737 it was republished under the title of *The Humours of Elections.*

GOTHAMITE. A New Yorker; a designation first applied by Washington Irving in *Salmagundi* in 1807.

GOTHENBURG, gō'ten-bōōrk. See GÖTEBORG.

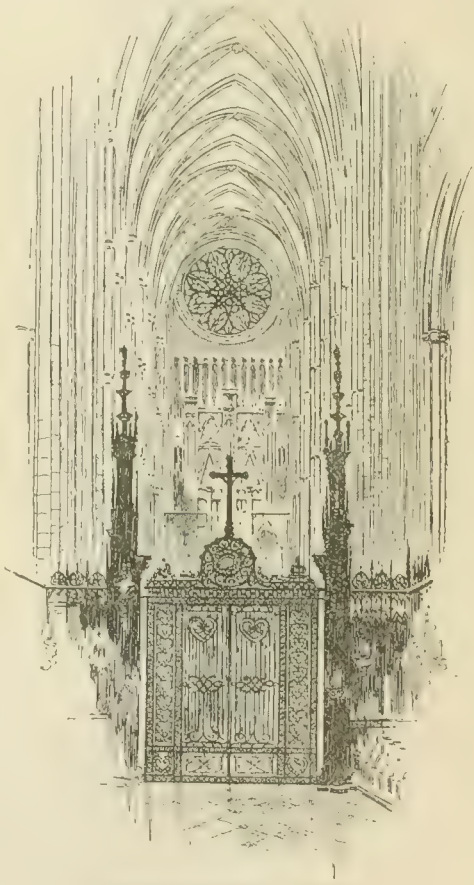
GOTHENBURG SYSTEM. The system of regulating the liquor traffic at Gothenburg or Göteborg, in Sweden, put in operation in 1865. In 1864 a committee on pauperism proposed as a remedy that the sale of the national drink —brandy—should, under the law of 1855, be bonded over to a company to carry on the trade for the benefit of the working classes. The general features of the system are as follows: The company is granted a monopoly for which it pays a tax; the shareholders, who are usually prominent citizens, cannot receive a dividend beyond six per cent. (five per cent. in Norway); the additional profits of the company are shared between the town, the agricultural society of the province, and the general Government (in Norway by educational and charitable institutions); the well-kept bars are placed in the hands of managers who receive a salary, who maintain eating houses with cheap, well-cooked food, and who can sell coffee, mineral waters, and cigars for their own profit. The policy of the company has been that of strict control, a reduction of the number of drinking places, and the raising of the price of brandy. Some of the results are the diminishing of the temptation to drink, the divorce of liquor from politics, the sale of pure spirits, and better rules as to minors and hours. The disadvantages are that the law does not go far enough, beer-drinking is increasing, and an undue importance is given to the system as a means of revenue. The system with variations has been widely adopted in other Swedish and Norwegian towns, and also in Finland. Consult *Fifth Special Report of the United States Commissioner of Labor* (1893); *Atlantic* (October, 1893). See TEMPERANCE.

GOTHIC ARCHITECTURE. The styles to which this name is given grew out of one branch of Romanesque architecture, which used the cross-vault or groin-vault (see VAULT) with ribs.

ORIGIN AND CHARACTER. The constant striving of the architects of the eleventh and twelfth centuries in France was to perfect a system of vaulting that should not enslave them to heavy walls or to narrow, low, and dark interiors. This could be done only by concentrating the horizontal, diagonal, and vertical strains and thrusts of the masonry entirely upon certain isolated points, and by balancing one by the other so as to produce a constructive skeleton in equilibrium. This was accomplished perfectly in Gothic architecture for the first time, though the principle itself was an old one. The ribs of Gothic vaulting, the piers that receive their downward pressures, the flying buttresses that take up and neutralize the horizontal thrust, form a pyramidal skeleton that would stand uninjured if all the walls and vaulting were removed. The pointed arch was first used in the vaulting because it not only exerted

less outward thrust with a given span (see RIBS), but also made it possible to construct vaults of any height, and on any oblong plan, and thus gave elasticity of form. The pointed form passed then to the next most constructive part of the church—the arches dividing nave and aisles, and the main doorways—and only later to the galleries, windows, and decorative details. It is important to remember that the pointed arch used in the Mohammedan, Sicilian, Burgundian, and other schools has nothing to do with the Gothic style, which is a constructive style following certain definite principles. It is the only thoroughly scientific and logical style of architecture ever developed, one that was absolute master of all materials; one in which nothing was left to chance or individual fancy. Its watchword was frankly to reveal its methods; every structural device showed. It did not spring at once into being, but was a gradual growth, involving, first, the invention of the means to effect constructive concentration and equilibrium; second, to develop the influence of these principles on architectural form; third, to give these forms the most artistic expression.

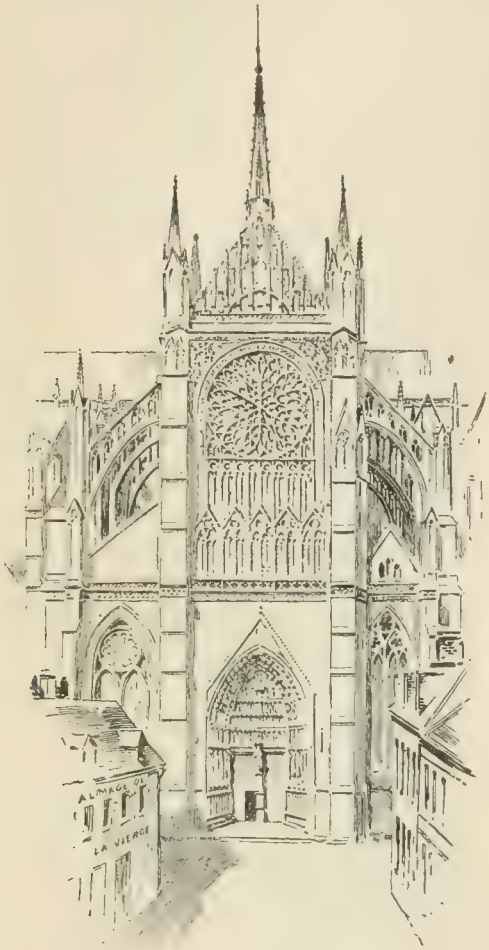
FRANCE. It originated in France, in the region about Paris, the region of the free communes, where there were no hampering traditions. It connected itself with the Romanesque schools of Normandy, Lombardy, and Picardy. The Ile-de-France alone shows all the preparatory stages, between 1100 and 1140, from Morienval to Saint Germer and Saint Denis, which are all but purely Romanesque in their forms, except in the vaulting. Architecture was still in the hands of the monasteries. Then comes the period of transitional Gothic, from c. 1150 to 1200, including the great group of earliest cathedrals, Senlis, Noyon, Laon, Sens, and greatest of all, Notre Dame (q.v.) in Paris. In buildings such as these the flying buttress is fully employed; the column replaces the Romanesque pier; vaults are made higher and perfected in structure. But the style is still rather stern and plain. The period of fully developed Gothic of the first half of the thirteenth century, when Notre Dame is completed, and the famous cathedrals of Chartres, Rheims, Amiens, and Beauvais are built, is the period that carries the principles to their logical conclusion in every detail: Gothic ornament is invented as a system expressed in tracery, in stained glass, in floral and vegetable ornament, in an encyclopædic series of figured sculpture that made the cathedrals a mirror of the universe as interpreted by mediæval thought. Complete mastery over material made it possible to raise the main vaults from the 108 feet at Notre Dame to the 160 feet at Beauvais. Desire for absolute consistency led to the adoption of a Gothic grouped pier instead of the earlier column, with members corresponding to the ribs of the vaulting and the moldings of the arcades, so that these lines flowed uninterruptedly upward. The nave of Saint Denis marks (about 1250) the climax of delicacy in, and the close of, the heroic stage, as its apse and façade had marked, a century before, the close of the tentative stage. Champagne, Normandy, Anjou, Burgundy, and parts of Central France had by the second decade of the thirteenth century accepted the new style as developed around Paris. But neither Auvergne, Brittany, nor the entire South had accepted it as yet. Where it did prevail the multitude of local schools, so clearly marked in Romanesque times, gradually disappeared. An almost uniform type prevailed. In plan: an enlarged choir with aisle and radiating chapels; no crypt; a short transept; three or five aisles; and sometimes a continuous line of aisle chapels. In elevation: a western façade with two flanking towers, three prominent portals, and a wheel or rose window in the centre; no expanse of walls, all the space between piers being occupied by windows filled with tracery and stained glass; an exterior in which figured and ornamental sculpture covered every surface, and flying buttresses marked the place of inner piers and vaults; an interior in which the old Romanesque gallery above the aisles dwindled to a mere base for the great line of clearstory windows, and where scientific knowledge was used to obtain effects of rhythm, of ascending lines, and delicacy of proportions. In the rich decoration the characteristic feature is the abandonment of classic and, indeed, of all traditional design, and the direct recourse to natural fauna and flora for models, which were of the greatest variety and truth. No period has so beautifully reproduced foliage and flowers in



AMIENS CATHEDRAL—INTERIOR.

stone. There were differences; for example, the façade towers terminate in spires at Chartres Cathedral, while at Notre Dame, Laon, Amiens, and elsewhere they have square terminations. Other differences, though not fundamental, make

special schools of Gothic in Burgundy (Notre Dame at Dijon, Cathedral Auxerre) and in Normandy (Cathedral Coutances, Bayeux, and Séez), while the Ile-de-France, Picardy, and Champagne are practically one school. If a single building were selected to typify perfect Gothic it would be Amiens Cathedral, for both internal and external effects. The exaggeration of delicacy and height next attempted at Beauvais Cathedral was both constructively and æsthetically a failure. Other great contemporary works were the



AMIENS CATHEDRAL.

cathedrals of Bourges, Le Mans (choir), and Soissons. In one thing only can we remain in doubt: that is how the façade would have been treated at this perfect period, for the façades then conceived (e.g. Rheims and Amiens) were not executed until the fourteenth or fifteenth century, those of Paris and Laon having been planned before the time of full bloom. While the fourteenth century carried on many of these earlier plans, it began very few churches. The terrible wars, the political confusion and impoverishment prevented it. The most classic and beautiful example is Saint Ouen at Rouen, worthy of a place beside those enumerated, but lacking somewhat in vitality, so that it belongs to the doctrinaire stage, illustrated elsewhere in Normandy (Séez and Caen, Saint Pierre). The final stage, which corresponds practically to the fifteenth and early sixteenth centuries is the concern more of the decorator than the architect, for no constructive problems are involved, and the novelties are due to a desire for merely formal variations. All manner of new forms of arches—surbased, reversed—are invented; there is a surcharge of ornament; unity and simplicity disappear, the use of vaulting-ribs as surface ornaments, which would have been abhorrent, is allowed, though not as much as in England and Germany. The term *flamboyant* (q.v.) is characteristic of both the sinuousness and glaring qualities of this style. Saint Riquier, Saint Maclou at Rouen, Notre Dame de l'Epine near Châlons, Saint Wulfrand at Abbeville, and the church at Brou, are the principal works of this age, some of them exemplifying the transition to Renaissance ornament.

Consult: Moore, *Development and Character of Gothic Architecture* (New York, 1899), for Early Gothic in all countries; Gonse, *L'art gothique* (Paris, 1890); Viollet-le-Duc, *Dictionnaire raisonné de l'architecture française* (Paris, 1858-68); the great volumes of *Archives* of the *Commission des monuments historiques* (Paris, 1855-72); Gurlitt, *Die Baukunst Frankreichs* (Dresden, n.d.), a folio with photographic plates; and the photographs taken for the Government by Robert and others.

Spain. The hybrid Byzantine-Moresco-Basilical architecture current in the Christian parts of Spain was beginning to be superseded by a Romanesque style of great dignity, borrowed from the South and West of France, when the French architects who were introducing it felt the first inroads of the Early Gothic style; that of Saint Germer, tempered by the Cistercian simplicity. The old Cathedral of Salamanca (close of twelfth century), with its heavy proportions but genuine Gothic vaulting, shows in certain features, especially in its magnificent dome, an original interpretation of Gothic principles. San Vincente at Avila, the Abbey Church at Veruela, and the cathedrals of Lérida, Tudela, and especially Tarragona, belong to the same period and style of heavy transition from Romanesque to Gothic. This group is as effective, well-composed, and imposing as any in Europe of this time. But we do not see the links that connect it with the developed Gothic of Burgos, Toledo, Leon, Valencia, and Barcelona cathedrals, built in the thirteenth century, because this style was not an indigenous outcome of the older buildings, but was brought straight from France. These and other buildings of less importance are so closely reproductions of the best French models—especially of the cathedrals of Amiens and Rheims—as to make Spanish Gothic second only to French in its purity and consistency. Even in the rich sculpture decoration French models are closely followed, though the round arch is retained quite late in the main portals. Perhaps Burgos presents on the whole the richest and most artistic exterior, as to towers, façade, and general composition. The unity of style was sadly disturbed in the fourteenth and succeeding centuries. English, German, Southern French, Italian, and Flemish elements were introduced, all more or less deviating from true Gothic design, and, worst of all, the national passion for

rich decoration led to the infiltration of Moorish ornament and details. Of this late and surcharged phase of Gothic architecture the monastery of Belem and the mausoleum of Manoel II. at Batalha, in Portugal, are the finest examples. Some of the Spanish churches are immense. The Toledo Cathedral was already one of the largest in Europe, but Seville Cathedral, begun in 1401, was the largest mediæval structure, measuring 415 × 298 feet. The lateness of Gothic sway is shown in the new Cathedral of Salamanca, built between 1510 and 1560, while the Renaissance was forcing its way into the country.

Consult: Street, *Gothic Architecture in Spain* (London, 1865); Junghändel and Gurlitt, *Die Baukunst Spaniens* (Dresden, 1891-93), with photographic illustrations; *Monumentos arquitectonicos de España*, in course of publication by the Spanish Government.

Great Britain. When, at the close of the twelfth century, Gothic began to replace Norman architecture in England it did not correspond as in France to any great national movement, like the rise of free communes and of episcopal power. The Anglo-Normans had contented themselves with wooden roofs, and so had not attempted to work out any vaulting system. Even the Cistercian monks, so fond of vaulting, did not attempt to introduce it in their English establishments. The introduction came through the work of an architect from the Ile-de-France, William of Sens, who rebuilt the choir of Canterbury Cathedral in 1175, followed by Trinity Chapel. Toward 1190 comes the first great work of the real Anglo-Norman Gothic, the choir and transept of Lincoln Cathedral. Unlike most early Gothic churches in England, it has contemporary vaulting. At this time there was no unity of style. Most of the great monastic churches, like Fountains, Kirkstall, Byland, Whitby, Rievaulx, are not vaulted, and use the shafts and moldings connected with vaulting purely as decorative features. The nave of Lincoln and the Cathedral of Salisbury (1220) follow one another early in the thirteenth century. What is called the Early English (q.v.) or Lancet style is now formed, lasting until 1280. This was followed by the Decorated or Geometric style (1280-1380) and by the Perpendicular style (1380 to sixteenth century). (See Articles on these subjects.) After one last and most perfect reproduction of the French style in the interior of Westminster Abbey (1245-69), the national peculiarities were accentuated. France had been relatively unproductive after the thirteenth century, but England built as many fine Gothic monuments in the fourteenth, fifteenth, and sixteenth as in the thirteenth. York, Ely, Wells, Lichfield, Canterbury, Winchester are among the most notable cathedrals. Viewed from the standpoint of scientific embodiment of Gothic principles, these English cathedrals depart woefully from pure French standards. Neither do we usually find unity of style in the same building. Norman churches often have Late Gothic vaulting. But, barring these defects, this group of English buildings is worthier to stand beside the French masterpieces than any other group in Europe. There are some marked peculiarities. The plan is very long and narrow, and the vaulting low; thus Amiens is 521 feet long and 140 feet high inside, while Ely is 565 feet long and only 75 feet high. The width of the English churches is but little more than half of the French. Besides, the choir end is square instead of polygonal, there is often a double transept at the east end, and the prevailing moldings are horizontal. All this gives a totally different effect to an English interior, which does not soar like the French. The exterior composition is also very different. The little Central French lantern is turned into a superb lofty tower, either square, as at Canterbury, York, Ely, Lincoln, or with a spire, as at Salisbury (424 feet high), Lichfield, and Chichester. No classic design for façades was followed, as in France, but every variety was indulged in, from the immense and picturesque screens at Lincoln and Peterborough to the more rational but commonplace façades of Lichfield and Wells. There is nothing to correspond to the broad portals and wealth of figured sculpture of France. But the great projection of the towers, the length of the body, the grouping of subordinate buildings, such as chapter-houses, cloisters, and chapels, and the picturesque surroundings give great effectiveness. Another marked peculiarity is the use of vaulting-ribs not purely for constructive, but for decorative purposes. Beginning by cutting up the vaulting surfaces into small compartments by diverging and cross ribs supplementing the original pair (*lierne* or *star* vaults), the next development was the famous *fan*-vaulting (q.v.) in which a great number of ribs diverge from separate centres and meet at apices. This is carried to its extreme in the Chapel of Henry VII. at Westminster. The most elegant examples of this style are in the polygonal chapter-houses of Lincoln, Westminster, Salisbury, and Wells, which are among the most charming creations of English Gothic. Toward the close of the Gothic period the English created a type of semi-ecclesiastical, academic, and civil architecture that is best exemplified at Oxford and Cambridge, and in many castles and halls of the English nobility. Consult: Prior, *A History of Gothic Art in England* (London, 1900); Van Rensselaer, *English Cathedrals* (New York, 1892); and the authorities referred to under Romanesque Art. See also Early English; Decorated Style; Perpendicular.

Germany. It is difficult to find a consistent character in German Gothic. It never became a national style as in France and England. The Romanesque style had had so superb a development in Germany that it was difficult to introduce a new style, and not until long after England and Spain, not until French Gothic had reached its fullest expression in France, did it find a foothold. The cathedral at Limburg copies Noyon, and is still plain and heavy (1235). The Liebfrauenkirche at Treves (1227), a copy of the French Church of Baione, is the first purely Gothic church. It was natural that the Rhinelands should first adopt the new style, not only from its proximity, but because it excelled other provinces artistically. Saint Elisabeth at Marburg is an early example of the Gothic hall church, with nave and aisles of equal height, a German peculiarity exemplified later at Nuremberg (Saint Sebald) and Breslau (Kreuzkirche). The supremacy of the Rhineland is emphasized in the second half of the thirteenth century in three great churches; the cathedrals of Strassburg, of Freiburg, and of Cologne, where French influence is almost unmixed with German pe-

culiarities. The true proportions of the interiors, the true constructive functions of the parts, are given better than in any English buildings, except Westminster; purest of all is the choir of Cologne (finished 1320), built long before the nave. In these Rhenish cathedrals there is a superb wealth of figured sculpture, which at Strassburg equals the finest French work. This school also produced most exquisite stone tracery, different from anything of the kind elsewhere, embodied in the façade and spire of Strassburg and the spire at Freiburg, like delicate lace openwork. The cathedral of Halberstadt and the abbey churches of Altenberg and Xanten belong to the same style. The great cathedrals influenced a multitude of construction, especially throughout the Rhineland, and led to the formation of a German version of Gothic, much less pure, much less artistic, but interesting as a national expression. The Franciscans and Dominicans were active. Local schools grew up, as in the Upper Rhine (Oppenheim), in Swabia, and Bavaria. The guilds of architects sent out masters from the main lodges. With the middle of the fourteenth century the territory occupied by Gothic architecture had immensely increased. Nuremberg had become a great centre (Saint Laurence; Saint Sebald; Frauenkirche). Great cathedrals were undertaken at Regensburg and at Ulm; also in Austria (Saint Stephen, Vienna). Although great pains were taken with the decorative work, it was decidedly lacking in artistic quality. The decorative ribs are not so pleasing as the English; the foliage-work on capitals, friezes, etc., is stiff and unnatural; the proportions are not happy. One of the least happy phases was the brick architecture of the north in the Baltic provinces and North Prussia, though interesting for marked peculiarities. Consult the authorities referred to under ROMANESQUE ART; also Moore, *Gothic Architecture, Its Development and Character* (London, 1899); Dehio and Bezold, *Die kirchliche Baukunst des Abendlandes* (Stuttgart, 1892-1901); Lübke, *Ecclesiastical Art in Germany During the Middle Ages*, translated by Wheatley (Edinburgh, 1870).

BELGIUM AND HOLLAND. The Gothic of Flemish towns partook of both French and German characteristics. At first French influence was paramount, as at Sainte Gudule in Brussels and at Tournai. In the fourteenth century by the side of such great cathedrals as Antwerp, already corrupt in taste, are those special Flemish creations the guild halls and town halls of Ypres, Bruges, Louvain, Mechlin, Ghent, Brussels, and Oudenarde.

ITALY. We can speak of a Gothic age but not of a Gothic style in Italy, for the Italians never mastered or cared to master the principles underlying Gothic construction, but adopted at their good pleasure, and with modifications to suit their genius, a good proportion of Gothic forms. The first Gothic inroads naturally appear to be by the hand of Frenchmen, such as the Cistercian monasteries of Fossanova, Casamari, San Galgano, and San Martino; as well as the gem Sant' Andrea at Vercelli, all belonging to the primitive transitional style. Then, at the mother church of the Franciscan Order, San Francesco at Assisi, the Gothic type was accepted by these monks as it was by the Dominicans. These two Orders were the main agents for diffusing Gothic forms throughout Italy; for, strange to say, while Northern Europe was replacing monastic architects by lay guilds in imitation of what Italy had done earlier, Italy meanwhile veered about, and nearly all her architects during the thirteenth and fourteenth centuries were monks. It is the churches of these two Orders at Bologna (San Francesco, San Domenico), Florence (Santa Maria Novella, Santa Croce), Venice (Santi Giovanni e Paolo, Santa Maria dei Frari), Rome (Santa Maria, Sopra Minerva), Treviso, etc., in which the type of Italian Gothic churches is developed, and the necessity with these preaching Orders of having an interior suitable as an auditorium, determined largely their artistic character. Nowhere else are there so many hall-churches of a single nave or with aisles nearly as lofty as the nave. There is some good tracery, but usually the southern proclivity to exclude light and the inability to understand the constructive laws of equilibrium that would make possible the elimination of wall-spaces, led to the use of almost as small windows as in the Romanesque period. Many so-called Gothic buildings, such as the cathedrals of Orvieto, Siena, and Lucca, are round-arched or wooden-roofed, or have columns in place of grouped piers, so that we miss every Gothic element. Even where groin-vaulting is used, as at Santa Maria Novella, at Florence, and Sant' Anastasia at Verona, two of the most beautiful examples in Italy, one misses the moldings of the grouped piers connecting structurally with the arcades and vaults, or with piers so widely spaced. For this reason it is that amid all the provincial differences there are certain traits common to most Italian churches. The wide spacing of the piers or columns, the height of the aisles, and the lack of detail make the interiors look much smaller than they are. The old simple apse was never abandoned for the rich polygonal choir with radiating chapels. Then, in place of sculpture, we find either a marble veneer in different colors (Tuscany) or terra-cotta ornaments (Lombardy). In most parts of Italy this is a sterile period. There was little building in Sicily and the south. Rome suffered from the Papal exile. The Lombard cities lost their freedom under tyrants. Only Venice, Florence, Siena, and neighboring cities produced much that was notable. In the fourteenth century cathedral architecture had adopted Gothic features from the monastic churches, as at San Petronio in Bologna, and in the most pretentious and un-Italian of cathedrals, that of Milan, in which so many French and German architects were employed. The bareness of the Italian interiors was occasionally redeemed by fresco-paintings, as in San Francesco at Assisi. It was in civil architecture that the Italians excelled. The pleasure palace of Venice, beginning as a Byzantine and Romanesque type, developed during the Gothic period into a beautiful creation, whose climax is the Cà d'Oro, and the Doge's Palace. The type spread to the mainland at Padua, Vicenza, Udine, and elsewhere. The fortress-palace is a different type, especially well developed at Florence, with its heavy bossed-work and stern aspect. The communal palaces were monuments rivaling the cathedrals; those at Florence (Palazzo Vecchio, Bargello, etc.), Siena, Perugia, Gubbio, and those farther north at Brescia, Bergamo, Cremona, Milan, Padua, etc., are superb compositions. Consult: Mothes, *Die Baukunst des Mittelalters in Italien* (Jena, 1884); Street,

Brick and Marble Architecture of North Italy (London, 1874); Fleury, *La Toscane au moyen âge* (Paris, 1874).

GOTHIC ART. The term was originally applied by the Italians to the pointed architecture which preceded the Renaissance in derision of its supposed barbaric character. The general adoption of this term was promoted by the erroneous idea that there was something essentially Germanic in the style, and the term, though unscientific, has been too long in general use to be given up. The Gothic period extends, roughly speaking, from the twelfth to the fifteenth century. It was a period of French ascendency, during which artistic influences radiated from France over the rest of Europe. The control of art passed from the hands of the clergy into that of lay guilds. Gothic art had its root in the life of the cities. Nevertheless, it bore the impress of chivalric character, being marked by a gentleness and charm which sometimes degenerated into sentimentality. With all this it contains a feeling for fun and mockery, as is especially shown in its grotesque sculptures, and at the end of the period there was a decided tendency toward realism. During this time sculpture and painting, though highly developed, were decorative in character, and strictly subordinated to architecture, to which, therefore, a separate article has been given. (See GOTHIC ARCHITECTURE.)

SCULPTURE.

FRANCE. The School of the Ile-de-France, which originated Gothic architecture, also began the use in the lower portals of statues, at first severely stiff. About 1210-20 statues of this character became freer and more artistic, though remaining part of the architecture. Among the best early examples are the portals of the Cathedral of Laon and the western portal of Notre Dame (q.v.) at Paris (1225). During the thirteenth century the use of statuary grew to an extent never before nor since practiced. It was concentrated upon the exterior of the buildings, centred about the portals, both of those of the façade, which usually terminated in three great pointed arches, and those of the side, which were often double. In order to accommodate the multitude of statues the portals were extended into porches. They were lined by rows of statues, and the tympanums were filled with reliefs. Great cathedrals of the thirteenth century were decorated with several thousands of statues; like Notre Dame, Chartres, and Rheims, called the Parthenon of the Middle Ages because of the beauty and delicacy of the statuary; Amiens—where the majestic statue of Christ, "Le bon Dieu," is eminent among many of high excellence—is particularly celebrated. The subjects represented were usually biblical and allegorical cycles, like the "Creation" and "Fall of Man;" Old and New Testament history, usually terminating in the "Last Judgment," a favorite subject; allegorical figures of the trades and industries, of virtues and vices. They were, in fact, the translation into stone of the religious and philosophical ideas of the day—Bibles and sermons in stone. Occasionally the figures were executed after nature, but more usually in accordance with geometrical canons, so comprehensive that even mediocre artists could do good work. The treatment of the nude was crude, but high success was attained in draperies, which will even bear comparison with the products of Greek art. Though realistic, the figures are always of a deep religious feeling and full of dignity. This, however, is lost in the late thirteenth and fourteenth centuries, when French sculpture aims increasingly at realism, becoming naïve and humorous. The centre of artistic activity shifts to Flanders and Northern Burgundy, where there was great activity at Dijon, under patronage of the Burgundian dukes. Since 1384 Claux Sluter de Orlandes was at the head of the works. His fresh, realistic manner is evident in the figures of the Fountain of Moses. The English Gothic, with few exceptions, was not adapted to sculptural decorations. The most important manifestation of sculpture here is in sepulchral monuments, funeral slabs and brasses, in which much realism is manifest.

GERMANY. The thirteenth century was the golden age of German mediæval sculpture, which was doubtless influenced by contemporary French art. As the Germans still built in the Romanesque style, their churches did not afford opportunity for great cycles of plastic art as did those of France. Their activity was confined to the interior of the church between the arches, the walls of the choir, the altar, and the pulpit; exterior decoration was rare and only practiced at the end of the epoch. The figures were full of life and dignity, less realistic than the French, and representing a calmer, higher ideal. As in the Romanesque epoch, the Saxon and Franconian schools lead. The early work of the Saxon School is best represented in the apostles and angels in the choir of the Church of Saint Michael, Hildesheims, and its highest development in the Church of Halberstadt. Heavier and more impassioned are the figures of the South Saxon School, as exemplified in the reliefs of the pulpit and the "Crucifixion" at Wechselberg; the famous "Golden Portal" at Freiburg, the sculptures of which represent, in a grandiose manner, the "Revelation of the Kingdom of God to Man by Christ;" and that most beautiful of German sepulchral monuments, the tomb of Henry the Lion and his wife Matilda in the Cathedral of Brunswick. The school reached its culmination in the latter part of the thirteenth century in the statues of the benefactors of the Church in the Cathedral of Nuremberg—simple, realistic, and dignified, and superb in treatment of drapery. Of equal excellence are the contemporary statues by the Franconian School in the Cathedral of Bamberg, of which the "Ancient Sibyl" is the best known. The Rhenish School followed the French more closely, as is evident in the Church of the Virgin at Trèves and in the minsters of Freiburg and Strassburg. More characteristically German are the sculptures of the Nuremberg churches, chiefly reliefs with small figures. In the fifteenth century sculptures in wood took the place of stone, with a change of style, though not of ideals, corresponding to the new material. The figures were treated with sharper lines, and the draperies in wrinkles instead of folds; both figures and draperies were colored. From this period date the finest Gothic altars and other ecclesiastical furniture of wood. The two chief schools were the Franconian, with Nuremberg as a centre, and the Swabian at Ulm. The chief artist of the latter was Joerg Syrlin the elder, whose chief work is the choir-stalls in the minster of Ulm (1469-74). The Germanic Museum and the churches of

Nuremberg contain fine examples of the wood-carving of that school. The chief artists were Michael Wohlgemuth (q.v.) and Veit Stoss (q.v.), who transplanted the art to Cracow, Poland. His latest and best work, however, falls in the Renaissance period.

ITALY. The school of Pisa was the first to achieve the revival of sculpture in Italy, in the person of Niccolâ Pisano (c. 1206-1278). Though belonging to the Gothic epoch, his sculptures owe all their inspiration to the antique, forming a sort of Proto-Renaissance. (See RENAISSANCE ART.) His son Giovanni (c. 1250-c. 1320), however, accepted the dramatic and naturalistic elements of Gothic art, and under Andrea Pisano, who was chiefly active in Florence, Gothic sculpture reached its highest development between 1310 and 1335. (For these three masters see ANDREA, and PISANO.) Its chief monuments in Tuscany are the sculptures of the façade of the Cathedral of Orvieto, the marble reliefs on the Campanile, and the bronze doors of the Baptistery of Florence. The style was further developed by the Florentine Andrea Orcagna (c. 1329-68) (q.v.), whose masterpiece is the tabernacle of Orsanmichele. The most important school outside of Florence was that of Siena, whence the art was transplanted to Naples and Lombardy, with Verona as a centre. In Lombardy the school developed a series of sepulchral monuments of great magnificence and originality, the most important of which are those of the Scaliger family. The Roman school of sculpture, which came to an end c. 1300, was not properly Gothic, but found all its inspiration in antiquity. (See COSMATI.) In like manner, the admirable South Italian School, which developed in the early thirteenth century under the patronage of the Emperor Frederic II., found its inspiration in Greek originals. (See ROMANESQUE ART.) As elsewhere, marble and stone were the chief materials used, though bronze casting was brought to high perfection by Andrea Pisano. Italian sculptors lacked the imagination of the French, their subjects being the traditional ones of the Old and New Testaments.

PAINTING AND ALLIED ARTS.

The breaking up of the wall surfaces in Gothic art left little opportunity for painting. There was, however, an increased opportunity for glass-painting, which, during this epoch, attained its highest development. The windows of the great French cathedrals were treated so as to form cycles of Biblical stories and Christian legends, showing the substance of the Christian doctrine. Most of these cycles have perished, but remains survive in the chief cathedrals. The most perfect thirteenth century example is the Cathedral of Chartres, with its one hundred and forty-six windows; the glasses of the Sainte Chapelle in Paris have been so perfectly restored as to give an excellent idea of the best period. Good English examples are to be found in the cathedrals of Salisbury, Lincoln, and York. In the fourteenth century came a decisive change with the introduction of architectural forms into glass-painting, which had heretofore been in patterns more like tapestry. In France glasses of that description are most frequent in the cathedrals of the south, and in private houses; but the finest examples are in Germany, especially in the Cathedrals of Cologne and Strassburg.

In Germany the buildings of the transitional style afforded more opportunity for mural paintings. On the Rhine a school arose at Cologne, in the fourteenth century, the mystic and sentimental inclinations of which show French influence. A Bohemian school flourished near Prague under the patronage of the Emperor Charles IV., the chief characteristic of which was a harsh realism. Midway between the two were the Franconian School, with a centre at Nuremberg, and the Swabian, the beginnings of which both fall in the fourteenth century. In the fifteenth century the increasing study of nature and the break-up of mediæval ideals led to the Renaissance of German painting. See PAINTING.

The few surviving examples of the paintings of the French and Flemish schools resemble those of the Lower Rhine. But in Italy the large wall spaces of Gothic architecture afforded ample opportunity for painting. From c. 1250 Italy takes the lead in painting, and in the latter twelfth and thirteenth centuries schools of fresco painting of great importance arose, of which the most important was the Florentine. Being of dominant importance for the development of painting, these schools are more properly treated under PAINTING, under the names of separate schools, like FLORENTINE SCHOOL, SIENESE SCHOOL, etc.; and, in detail, in the articles upon prominent artists, like CIMABUE, GIOTTO, ORCAGNA, etc.

Mural decorations in private houses were common. The style was the same as in churches, but the subjects represented were chivalric, the same that were sung by trouvère and Minnesänger. Similar in subject and style were the tapestries (q.v.), and other textile products of the period. There was a very high development of miniature painting (q.v.), especially in France and Italy. Consult the authorities referred to in the articles on PAINTING, and MINIATURE PAINTING.

BIBLIOGRAPHY. For French sculpture consult: Adams, *Recueil de sculptures gothiques* (Paris, 1856); Baudot, *La sculpture française au moyen âge et à la Renaissance* (Paris, 1884); Emeric-David, *Histoire de la sculpture française* (Paris, 1853); Frothingham, Jr., in *American Journal of Archæology*, 1885. For Germany, see Bode, *Geschichte der deutschen Plastik* (Berlin, 1889); Lübke, *Geschichte der Plastik* (Leipzig, 1880). For Italy, Bode, *Die italienische Plastik* (Berlin, 1891); Perkins, *Tuscan Sculpture* (London, 1864); Italian Sculpture (ib., 1868); *Handbook of Italian Sculpture* (New York, 1883).

GOTHIC JURISPRUDENCE. The law of the Goths, as well as the Roman law codified and administered by them. The Goths had originally the same law as the other Germanic races, it being administered on the whole by the family, and only very grave criminal offenses being dealt with by the State. What makes Gothic jurisprudence especially interesting is the adoption of the Roman law, and its codification. This is true of the Visigoths rather than the Ostrogoths, who merely used the Byzantine law as it existed in Italy upon their invasion. Side by side with this, their own law continued in force. In Spain, however, Alaric II., King of the Visigoths, in 506 issued a codification of the Roman law, the *Lex Romana Wisigothorum*, better known as the *Breviarium Alaricianum*. It was revised by King Egica (687-701). Until the thirteenth century

the *Breviarium Alarician*um remained the chief source of Roman law for Western Europe, and as such exerted a great influence on the development of law, especially in Spain, where Ferdinand III. (1217-52) introduced it under the title of *Fuero juzo* (Lat. *forum judiciale*). Consult: Pollock and Maitland, *History of English Law*, vol. i. (2d ed., Oxford, 1899); Zeumer, "Lex Wisigothorum" in *Monumenta Germania historica, Leges, sectio I.* (Hanover, 1894). See CIVIL LAW.

GOTHIC LANGUAGE (Lat. *Gothicus*, from *Gothus*, Gk. Γότθος, Gothos, Γύθων, *Gythōn*, from Goth. *Gut-þiuda*, Goth-people, AS. *Gōtan*, OSwed. *Gutar*, *Gotar*, Goths; cf. dialectic Norweg. *gut*, boy). The language spoken by the Goths (q.v.). Excepting the Old Icelandic runic inscriptions (see RUNES) and a few Germanic glosses and proper names preserved in classical authors, such as Cæsar and Tacitus, Gothic is the oldest monument of all the dialects of the Germanic group of Indo-Germanic languages. Like Anglo-Saxon, Frisian, and Old Icelandic, it has undergone only the first sound-shifting, or ablaut, and is consequently one of the Low Germanic languages, as contrasted with Old High German, where the second sound-shifting has been carried through. (See GRIMM'S LAW.) Within this Low Germanic sub-group it is most closely akin to the Scandinavian (Old Icelandic, Old Norwegian, Old Swedish, Old Danish, and their modern representatives), so that some scholars class Gothic and Old Scandinavian together as East Germanic, contrasting this group with the Anglo-Frisian and High Germanic languages, which are then termed West Germanic. The most important points of coincidence between Gothic and Icelandic are the development of Germanic *uu* to *ggw* (as Gothic *triggwrs*, Old Icelandic *tryggr*, 'true,' but Anglo-Saxon *trēowe*, Old High German *triuwi*), and the retention of final *z* (Gothic *s*, Old Icelandic *r*), which is lost in West Germanic (as Gothic *dags*, Old Icelandic *dagr*, 'day,' but Anglo-Saxon *dæg*, Old High German *tag*). On the other hand, Gothic and Scandinavian diverge in many respects, especially in declension and conjugation (as runic Norse *þohtriR*, 'daughters,' but Gothic *dohtrjus;* runic Norse *tawi þo*, 'I did,' but Gothic *tawida*). It therefore seems better on the whole to regard Gothic and Scandinavian as belonging to different groups, which may be termed East and North Germanic respectively.

The sources of our knowledge of Gothic are limited. The earliest gloss preserved is in Isidor of Seville, who cites the words *medus*, 'mead,' and *reptus*, 'garment.' The Lex Visigothorum also contains a few Gothic words, as *leudes*, 'people,' and *saio* (whence the Spanish *sayon*), 'beadle.' The most important and extensive remnant of the language is the fragments of the translation of the Bible by ULFILAS (q.v.). There are also a few words, chiefly proper names, in two documents found at Naples and Arezzo, and a fragment of a calendar.

In phonology and inflection Gothic is the most primitive of all the Germanic languages. Its pronunciation is fixed by our knowledge of that of Greek in the fourth century. Thus as *ει* in Greek then had the itacistic value of *ī*, *ī* is represented in Gothic by *ei*. Similarly *ng* is written *gg* in Gothic in conformity with the Greek use of *γγ* instead of *νγ*. The vowels and consonants correspond in general to the Pre-Germanic phonology. Short *e*, however, does not occur, being changed to *i* (as Old High German *neman*, 'to take,' but Gothic *niman*), which is written *ai* before *h* and *r* (as Gothic *aírþa*, 'earth,' *raíhts*, 'right,' but Old High German *erda*, *reht*), exactly as *u* is written *aú* in a similar position (as Gothic *waúrms*, 'worm,' *saúhts*, 'sickness,' but Old High German *wurm*, *suht*). Pre-Germanic *z*, which became *r* in the other Germanic languages, remained *z* in Gothic, but sometimes, for reasons not yet altogether clear, it was changed to *s* (as Gothic *ausō*, 'ear,' but Old High German *ôra*). The declension does not differ materially from the Germanic type. The pronouns of the first and second persons have, as in Old Icelandic, Anglo-Saxon, and Old Saxon, a dual. The conjugation of the verb, while harmonizing in general with the Germanic type, is marked by a number of important features. Gothic is the only Germanic language in which the verb retains the dual number (as *baírōs*, 'we two bear,' *baírats*, 'ye two bear,' Sanskrit, *bharāvas*, *bharathas;* *bairaiwa*, 'we two bore,' Sanskrit, *abharāva*), and the third person of the imperative (*baíradau*, 'let him bear,' *bairandau*, 'let them bear,' Sanskrit, *bharatu*, *bharantu*). The reduplicated preterit which is very rare in other Germanic languages, is frequent in Gothic, eleven preterits of this type being found in the scanty remnants of the literature. As examples may be cited: *faifāh*, from *fāhan*, 'to seize,' *haíháit*, from *hātan*, 'to call,' *raíroþ*, from *rēdan*, 'to counsel,' *saísō*, from *saian*, 'to sow.' For all these preterits the Anglo-Saxon, for example, has as corresponding forms *fēng*, *heht*, *reord*, *sēow*. Most noteworthy of all, however, is the fact that Gothic, unlike any other member of the Germanic group, possesses a middle voice in other verbs than *hātan*, 'to call.' Thus Gothic *baíraza*, 'thou bearest thyself,' *baírada*, 'he bears himself,' *baíranda*, 'they bear themselves,' correspond to Sanskrit *bharasē*, *bharatē*, *bharantē*.

In its vocabulary Gothic has a number of Indo-Germanic words which are not found in the other Germanic languages, as *us-anan*, 'to breathe forth,' Latin *animus*, 'breath;' *aljis*, 'other,' Latin *alius*. On the other hand, it has no etymological representation of such common Germanic words as *do*, *say*, *fall*, *mother*, for which it substitutes *taujan*, *qiþan*, *driusan*, *aiþei*. As might be expected in a translation of the Bible, Greek and Latin loan-words are quite numerous. It has likewise borrowed a few Celtic words, as *kēlikn*, 'tower,' from Gallic *cēlicnon*, and two from the Slavic, *plinsjan*, 'to dance,' and *smakka*, 'fig' (cf. Old Church Slavic *plęsati*, smoky).

Literary Gothic is sometimes termed West Gothic, to distinguish it from East, or Krim, Gothic. The Crimean Goths preserved their identity until the sixteenth century. A collection of eighty-six Krim Gothic words was made in 1595 by a Fleming named Busbeck. The list, which is of great value as being the only remnant of this dialect of Gothic, is in general accurate, although some errors naturally crept in, as *hazer*, 'thousand,' which is a loan-word from Persian *hazār*. It adds a number of words to the Gothic vocabulary, as *miera*, 'ant,' *rinck*, 'ring,' *ada*, 'egg,' *waghen*, 'wagon.' In phonology Krim Gothic seems to have differed from the language of Ulfilas. The vocabulary of Busbeck contains little information on inflection. If we may judge, however, from such hints as Krim *oeghene* beside Gothic *augōna*, 'eyes,' Krim *ahte*, 'eight,'

beside Gothic *ahtáu*, Krim *singhen*, 'to sing,' beside Gothic *siggwan*, Krim *tag* (for *dag*), 'day,' beside Gothic *dags*, it would seem that a change had taken place within the twelve centuries between Ulfilas and Busbeck, which was, roughly speaking, analogous to the transition from Old to Middle High German.

To the same East Germanic group as the Gothic belong the Vandal and Burgundian languages, of which only scanty fragments, chiefly proper names, survive.

The Gothic alphabet was invented by Ulfilas. He took as his basis the Greek letters, adding some Latin characters, and a few signs from the runes which were previously in use among the Goths. The number of letters was twenty-seven, of which two, corresponding to the Greek koppa and sampi, had numerical values alone, and a third, the equivalent of the Greek chi, was used only in foreign proper names. The alphabet really consisted, therefore, of twenty-four letters, which are, in modern editions of Gothic texts, transliterated into the ordinary Roman alphabet with the addition of *þ* and *hw*.

Consult: Bernhardt, *Kurzgefasste gotische Grammatik* (Halle, 1885); Braune, *Gotische Grammatik* (4th ed., ib., 1895); Streitberg, *Gotisches Elementarbuch* (Heidelberg, 1896); Wright, *Primer of the Gothic Language* (2d ed., Oxford, 1899); Kluge, "Geschichte der gotischen Sprache," in Paul, *Grundriss der germanischen Philologie*, vol. i. (2d ed., Strassburg, 1901); Skeat, *Mœso-Gothic Glossary* (London, 1868); Balz, *Comparative Glossary of the Gothic Language* (Mayville, Wis., 1887-89); Feist, *Grundriss der gotischen Etymologie* (Strassburg, 1888); Uhlenbeck, *Kurzgefasstes etymologisches Wörterbuch der gotischen Sprache* (2d ed., Amsterdam, 1900); Tomaschek, *Die Goten in Taurien* (Vienna, 1881); Loewe, *Die Reste der Germanen am Schwarzen Meere* (Halle, 1896); Wrede, *Ueber die Sprache der Wandalen* (Strassburg, 1886); id., *Ueber die Sprache der Ostgoten in Italien* (ib., 1891). For editions of the Gothic texts, see the bibliography on ULFILAS.

GOTHIC VERSION. See BIBLE.

GOTH'LAND. See GOTLAND.

GOTH'OFRED. See GODEFROY.

GOTH'OFRE'DUS. See ABELIN, JOHANN PHILIPP.

GOTHS. The name of a powerful nation of antiquity, belonging to the Germanic race. By some writers they are thought to have had a Scandinavian origin, which was the belief of their own historian, Jordanes. The earliest notice of them extant among the writers of antiquity is that of Pytheas of Marseilles, who lived about the time of Alexander the Great, and wrote a book of travels, some fragments of which have been preserved in the works of other writers. In one of these fragments, quoted by Pliny, we find mention made of a tribe of *Guttones* bordering upon the Germans, and living round a gulf of the sea called Mentonomon, a day's sail from the island of Abalus, where they used to gather amber and sell it to the neighboring Teutones. This gulf, there is every reason to believe, was the *Frisches Haff*, situated on the Prussian shore of the Baltic. The next notice that occurs of the Goths is in the *Germania* of Tacitus, in which they are called Gothones, and are represented as dwelling beyond the Lygii, in the same direction as the one pointed out by Pytheas, though not on the seacoast. Tacitus also distinguishes them from the Gothini, a tribe east of the Quadi and the Marcomanni, and represented by him as using the Gallic tongue. The Gothones, according to this historian, were under regal government, and on that account not quite so free as the other tribes of Germany, but still they enjoyed a considerable amount of liberty. The tribes next beyond them, and dwelling immediately on the seacoast, were the Rugii and Lemovii, whose form of government was also monarchical and their weapons, like those of the Gothones, round shields and short swords.

We next hear of the Goths as settled on the coast of the Black Sea, about the mouths of the Danube, early in the third century. But at what time, or under what circumstances, their migration from the Baltic to the Euxine took place, it is impossible to ascertain. In their new home, which was also the country of the Getæ (whence, perhaps, the error that confounded them with that people), the Goths increased in both numbers and strength, so that, as early as the reign of Alexander Severus (A.D. 222-235), they made some formidable inroads into the Roman Province of Dacia. In the reign of Philip (A.D. 244-249) they ravaged that province, and even advanced to the siege of Marcianopolis in Mœsia Secunda. The inhabitants ransomed their lives and property with a large sum of money, and the invaders withdrew for a time to their own country. Under Decius, however, they again entered Mœsia to the number of about 70,000, led by a King named Cniva. Decius himself advanced to meet them, and found them before Nicopolis. On his approach they raised the siege and marched away to Philippopolis, a city of Thrace, near the foot of Mount Hæmus. Decius pursued them by forced marches, but the Goths turned with fury upon the Roman legions and utterly defeated them. Philippopolis next fell before them by storm, after a long resistance, during which, and the massacre that followed, 100,000 of its inhabitants are reported to have been slain. This was in A.D. 250. In the following year another tremendous battle took place near an obscure town called Forum Trebonii, in Mœsia, in which the Romans were again defeated with great slaughter, the Emperor Decius and his son being in the number of the slain. The succeeding Emperor, Gallus, purchased their retreat by an immediate present of a large sum of money and the promise of an annual tribute for the future. The Goths now set themselves to the acquisition of a fleet, and with this, in 253, advanced to the conquest of Pityus, a Greek town on the northeast coast of the Black Sea, which they completely destroyed. In 258 they besieged and took Trebizond, when a great fleet of ships that were in the port fell into their hands. In these they deposited the booty of the city, which was of immense value; chained the youth of the seacoast to their oars; and returned in triumph to the Kingdom of Bosporus. In the following year, with a still more powerful force of men and ships, they took Chalcedon, Nicomedia, Nice, Prusa, Apamea, and Cius. In a third expedition, which numbered as many as 500 vessels, they took Cyzicus, then sailed down the Ægean, ravaged the coast of Attica, and in 262 anchored at the Piræus. Athens was now taken and plundered, and many other renowned places in Greece

were either partially or wholly destroyed. Even Italy was threatened; but the danger drew the indolent Emperor, Gallienus, from his seclusion. The Emperor appeared in arms, and his presence seems to have checked the ardor and to have divided the strength of the enemy. A portion of the Goths now returned to their own country. But in 269 they again started on a maritime expedition in far greater numbers than ever. After ravaging the coasts of both Europe and Asia, the main armament at length anchored before Thessalonica. In Claudius II., the successor of Gallienus, however, the Goths found a far abler general than any they had yet contended with. This Emperor defeated their immense host, said to number as many as 300,000 men, in three successive battles, taking or sinking their fleet, and after an immense slaughter of their troops, pursuing such as escaped until they were hemmed in by the passes of Mount Hæmus, where they perished for the most part by famine. This, however, was only a single reverse. Aurelian, the successor of Claudius, was obliged to cede to them, in 272, the large Province of Dacia, after which there was comparative peace between the combatants for about fifty years. In the reign of Constantine their King, Alaric, again provoked hostilities, but was obliged eventually to sue for peace with the master of the Roman Empire. Under Valens they once more encountered the Roman legions, with whom they carried on a war for about three years (367-369) with tolerable success. They now began to be distinguished by the appellations of Ostrogoths and Visigoths, or the Goths of the east and the west; the former inhabiting the shores of the Black Sea, and the latter the Dacian province and the banks of the Danube. On the irruption of the Huns the Visigoths sought the protection of Valens against those barbarians, and in 376 were allowed by him to pass into Mœsia, to the number of about 200,000. Great numbers of them also now took service in the Roman Army; but a dispute soon arose between the Goths and their new allies, which led to a decisive battle in 378, near Adrianople, in which the Emperor Valens lost his life. The Goths now threatened Constantinople, but were not able to take it; and during the reign of Theodosius there was again a period of comparative peace.

Henceforward the history of the Visigoths and Ostrogoths flows in two divergent streams. Before tracing either of these, however, it should be mentioned that the Goths, for the most part, became converts to Christianity about the middle of the fourth century, adopting the Arian form of belief. Here, also, it may be stated that the term Mœsogoths was applied to certain of the western Goths, who, having settled in Mœsia, devoted themselves to agricultural pursuits, under the protection of the Roman Emperors.

VISIGOTHS. Upon the death of Theodosius the Great in 395, and the partition of the Empire between Honorius and Arcadius, the renowned Alaric, King of the Visigoths, invaded Greece with an army of his countrymen. His retreat was purchased by giving him a commission to govern Illyricum. In 402 he invaded Italy, took and pillaged Rome (410), and was preparing to carry his arms into Sicily and Africa, when his career was arrested by death. (See ALARIC.) Alaric was succeeded in the sovereignty by Athaulf (410-415), who, having married Placidia, the sister of Honorius, withdrew from Italy into the south of Gaul, and about 412 crossed the Pyrenees into Spain. Athaulf was assassinated at Barcelona, and his successor, Sigeric, dying the same year, the choice of the Goths now fell on Wallia (415-419), who extended his power over a great part of Southern Gaul and Spain, and made Toulouse his capital. The Goths, under this monarch, greatly assisted the Romans in their contests with the Vandals and the Alani. Wallia was succeeded by Theodoric I. (419-451), son of the great Alaric. He lost his life fighting on the side of the Romans against Attila at Châlons, leaving the throne to his son, Thorismund (451-453), who, however, was assassinated by his brother THEODORIC II. (453-466), who was himself assassinated by his brother Euric (466-483). The reign of Euric was unusually brilliant and successful. He extended the sovereignty of the Visigoths considerably both in France and Spain, introduced the arts of civilization among his subjects, and drew up for their use a code of laws. Under his successors, Alaric II. (483-507) and Amalaric (507-531), however, the kingdom of the Visigoths declined before that of the Franks. Alaric II. fell by the hands of Clovis in battle, and Amalaric was killed by the hand of an assassin. Under the latter's successor, Theudis, the rule of the Visigoths was confined exclusively to Spain. Theudis was in his turn assassinated in his palace at Barcelona in the year 548. It will not be necessary to trace the long line of Visigothic kings that subsequently ruled in Spain from this period down to the year 711. The Visigothic power was completely broken by the Saracen invaders on the battlefield of Jerez de la Frontera. (See SPAIN.)

OSTROGOTHS. At the coming of the Huns, part of the Ostrogoths had been conquered and compelled to lend aid; thus they joined Attila in his renowned expedition against Gaul, and fell by thousands under the swords of their kinsmen, the Visigoths, at the battle of Châlons, in 451. After this they obtained a settlement in Pannonia, where they were joined by the other Ostrogoths, who had, at the coming of the Huns, been admitted within the Roman Empire. In 476 Theodoric, the greatest of the Ostrogoth sovereigns, succeeded to the throne upon the death of his father, Theodemir. He directed his arms almost immediately against the Eastern Emperor, Zeno; and having gained considerable advantages over him, obtained a grant of some of the richest provinces in the Empire. Eventually, he was named chief of the Imperial guard, and consul for the year 484. In 488, with the consent and advice of Zeno, he planned an immense expedition again Odoacer, King in Italy, who had held that position since 476, when he dethroned Romulus Augustulus, the last of the Western emperors. Theodoric utterly defeated Odoacer, slew him, it is said, with his own hand, in 493, and reigned undisturbed sovereign of Italy until his death in 526. The seat of his empire was at Ravenna, and in 500 he visited Rome, when he convened a meeting of the Senate, and declared that it was his intention to rule the people committed to his charge with even-handed justice. To a great extent, he fulfilled this promise, and governed his subjects, upon the whole, wisely and to their advantage. The glory of his reign was, however, sullied by the execution of two of the most distinguished men of that

age, Boëthius and Symmachus, upon the plea that they were engaged in a conspiracy against him. In the disorders consequent upon the death of Theodoric, the Emperor Justinian sought to win back Italy to the allegiance of the emperors of Constantinople; and for this purpose he dispatched Belisarius at the head of an army into that country. In 536 Belisarius entered Rome, which he held for his master, although invited by the Goths to become himself their King; but all his and his successor's efforts to subdue the Goths were at that time utterly fruitless. Totila (541-552), a noble Goth, was elected as successor to Vitiges, the antagonist of Belisarius, but was conquered in the battle of Tagina, by the Imperial general Narses, in the year 552. In that battle Totila received his death wound, and was succeeded by Teias, who did all that a brave man could to repair the misfortunes of his countrymen. It was to no effect, however, for he also was killed in battle in the following year. The Ostrogoths, broken and dispersed by their calamities, henceforward disappear from history as a distinct nation, their throne in Italy being filled by the exarchs of Ravenna; while the nation generally became absorbed in the indiscriminate mass of Alani, Vandals, Burgundians, and Franks, who had from time to time established themselves in the dominions of the old Roman Empire. Consult Bradley, *The Story of the Goths* (New York, 1888).

GOTLAND, gŏt'land, or **GOTHLAND** (Swedish *Gottland*). An island in the Baltic Sea, situated about 44 miles off the eastern coast of Sweden, and forming, together with the adjacent islets of Farö and Gotska Sandön, the Swedish Län of Gotland (Map: Sweden, H 8). Its greatest length is nearly 80 miles, its greatest breadth about 35 miles, and its area nearly 1140 square miles. The surface is level and the soil fertile, while the climate is comparatively mild. A large part of Gotland is under forests, and the arable land constitutes only about one-fifth of the total area. The chief occupations are agriculture and the breeding of live stock. There is also some manufacturing of lime, and a number of the inhabitants are engaged in seafaring. There are a number of good harbors, of which Slite Hamn is the most important. The population of the län was 52,781 in 1900. Chief town, Wisby (q.v.). The island was in the possession of Sweden as early as the ninth century. In the Middle Ages Wisby was an important member of the Hanseatic League. The island was taken several times by Denmark. It came back into the possession of Sweden in 1645.

GOTSKOWSKI, gŏts-kŏv'skē, JOHANN ERNST. See GOTZKOWSKI.

GOTTENBURG, gŏt'ten-bo̅o̅rk. See GÖTEBORG.

GOT'TER, FRIEDRICH WILHELM (1746-97). A German poet and dramatist, born at Gotha. He began the study of law, but was early influenced to write for the theatre. While at Wetzlar he became the friend of Goethe. Gotter wrote tragedies, comedies, and songs. He was a great admirer of everything French. Perhaps his best work is *Medea* (1775), for which Benda wrote the music (1778). His complete works were published in 1787, and a posthumous volume, *Litterarischer Nachlass*, in 1802.

GÖTTERDÄMMERUNG, gĕt'ĕr-dĕm'ĕr-ung (Ger., Twilight of the Gods). The last of the four divisions of Wagner's music drama, *Der Ring des Nibelungen*. It was first produced on August 17, 1876, at Bayreuth. See RING OF THE NIBELUNGEN.

GÖTTERDÄMMERUNG. See RAGNARÖK.

GOTTFRIED, gŏt'frĕt, JOHANN PHILIPP. See ABELIN.

GOTTFRIED VON STRASSBURG, sträs'-bo̅o̅rk (c.1200). The most brilliant of the German poets of the thirteenth century. Of his personality nothing is known save that he was of good family, and held some high public office in Strassburg. His greatest poem, "Tristan and Isolt" (about 1210), is a Celtic legend that reached Germany from France, and was given by Gottfried the form that has widely influenced later literature and furnished Wagner a subject for a great opera. This poem is in 19,552 very polished verses that give to the story of fateful passion a tragic force that is lacking in the French narrative. Gottfried left the poem at the moment when Tristan, parted from Isolt by the jealous uncle and husband, King Mark, has withdrawn to Normandy, and has vainly sought consolation from Isolt of the White Hands. The epic was twice concluded, by Ulrich von Türheim (1236), and by Heinrich von Freiberg (1270), both inferior poets. Gottfried wrote lyrics also, and has been one of the most widely imitated of the German mediæval poets. Gottfried's *Works* are edited by Bechstein (2 vols., Stuttgart, 1881) with an excellent critical introduction. There are translations of *Tristan* by Kurz (Stuttgart, 1844), and Simrock (Leipzig, 1855).

GOTTHELF, gŏt'hĕlf, JEREMIAS. The pseudonym of the Swiss author Albert Bitzius (q.v.).

GOTTI, gō'tē, GIROLAMO MARIA (1834—). An Italian prelate of the Roman Catholic Church. He was born in Genoa, where his father was a dock laborer. He joined the Carmelite Order at an early age, and, showing an unusual bent toward physical science, was made professor of mathematics and natural philosophy in one of their colleges. Later he became provincial, and a consulter of the Roman congregations. His diplomatic ability caused him to be selected for various special missions to South American States, which he fulfilled with success, especially in Brazil. In 1895 he was created a cardinal, and later prefect of the Congregation of Bishops and Regulars. In 1902 he was selected, on the death of Cardinal Ledochowski, as prefect of the Propaganda (q.v.)—a still more important office, practically second in importance and responsibility to the Papacy, for the succession to which his name was frequently mentioned, especially as the candidate of the Jesuit Order.

GÖTTINGEN, gē'ting-en. An old town of the Prussian Province of Hanover, situated on the Leine, 36 miles north by rail east of Cassel (Map: Prussia, C 3). With the exception of the fourteenth-century Rathaus, containing frescoes by Schaper, the modern theatre, and the famous Göttingen University (q.v.), the town has no buildings worthy of mention. Of its many educational institutions, the most noteworthy, aside from the university, are the gymnasium, founded at the end of the sixteenth century, the pedagogical seminary, and the municipal museum of

antiquities. The Aula has a picture collection with some good examples of the early Dutch and German schools. Göttingen is provided with a good water-supply. The chief manufactures are cloth, leather, scientific instruments, tobacco, and famous Bologna sausages. The Blumenbach collection of skulls is in Göttingen. Population, in 1890, 23,689; in 1900, 30,234, chiefly Protestants.

The town is first mentioned in the tenth century. It was given municipal rights by Otho IV. at the beginning of the thirteenth century, and in 1261 became the residence of the Princes of Brunswick-Lüneburg. It was a prominent member of the Hanseatic League, and famous for its cloth goods. Its prosperity was interrupted by the Thirty Years' War, when it fell twice into the hands of the Swedes. The establishment of the university gave Göttingen new importance, and at the close of the eighteenth century it was a flourishing literary centre.

GÖTTINGEN, University of, or Georg-August University. A German university founded by Georg August, Elector of Hanover, better known as George II. of England. It was planned as early as 1732, there being no university in Hanover at that time, and lectures were begun two years later; but the formal foundation dates from 1737. Its organization was the work of the statesman Von Münchhausen, a man of marked ability, who remained in control for many years. Noted teachers, a well-chosen library, a large endowment, and the liberal character of the university soon gave it distinction. The Seven Years' War was a time of depression, but between 1770 and 1790 it was again much frequented. The courses in history, philology, and law were preëminent; in the study of history especially broader and more liberal conceptions prevailed. During the French Revolution and the Napoleonic wars there was another period of depression, followed by renewed prosperity. In 1823 the attendance was greater than it is in 1903; but reverses in 1831 and 1837 brought affairs for a third time under a cloud. During the latter half of the nineteenth century, however, there was a slow and steady growth, due mainly to the excellence of the instruction in mathematics and the natural sciences. The students number nearly 1500. There are a large number of laboratories, clinics, seminaries, and the like. The library contains 6000 manuscripts and over 500,000 volumes; for modern books it is probably the richest in Germany. Consult: Pütter, Saalfeld, and Oesterley, *Die Georg-August-Universität* (Göttingen, 1838); *Chronik der Georg-August-Universität für 1889-90* (Hanover, 1890).

GÖTTLING, gĕt'ling, Karl Wilhelm (1793-1869). A German philologist, born at Jena. He studied under Wolf, Böckh, and Buttmann at Berlin, and after holding various minor professorships was appointed professor extraordinary of philology at Jena in 1822, and full professor in 1832. In 1826 he was made director of the Philological Seminary and university librarian. His chief works are: *Ueber das Geschichtliche im Nibelungenliede* (1814); *Nibelungen und Ghibellinen* (1817); *Allgemeine Lehre vom Accent in der griechischen Sprache* (5th ed. 1835, translated as *Elements of Greek Accentuation*, London, 1831); *Geschichte der römischen Staatsverfassung bis auf Cäsars Tod* (1840); and *Gesammelte Abhandlungen aus dem klassischen Altertum* (vol. i. 1851, vol. ii. 1864); and editions of Aristotle's *Politica* (1824) and *Œconomica* (1830), and of Hesiod's *Carmina* (3d ed. 1878). His *Opuscula Academica* (1869) were published and edited after Göttling's death by Fischer. Consult: *Der Briefwechsel zwischen Goethe und Göttling* (Munich, 1880); Nipperdey, *Memoria C. Goettlingii* (Jena, 1869); and Lothholz, *Karl Wilhelm Göttling* (Stargard, 1876).

GOTTSCHALK, gŏt'shâlk, or Fulgentius (c. 805-c. 868). A prominent figure in a theological controversy of the ninth century. He was the son of Berneo, a Saxon count, and was placed by his parents at an early age in the monastery of Fulda. At the approach of manhood he tried to secure release from his vows, but failed owing to the opposition of his abbot, Rabanus Maurus (q.v.). He was permitted to remove to the monastery of Orbais in the diocese of Soissons, and there devoted himself to the writings of Saint Augustine, and became an enthusiastic believer in the doctrine of predestination, even going beyond his master, and holding to a predestination to condemnation as well as to salvation. In 837-838 he went to Italy, partly for the purpose of spreading his views. It was there he met Bishop Noting, who was so scandalized by Gottschalk's views that he called upon Rabanus to assist in suppressing the heretical opinions. In 839 Gottschalk became priest, and then had the right to preach. This gave him a great advantage. In 845-848 he was again in Italy, and for two years was the guest of Eberhard, Count of Friuli. Rabanus, now Archbishop of Mainz, warned the Count against Gottschalk as a dangerous heretic, and he turned him out of doors. Gottschalk then wandered into Germany, preaching everywhere. Rabanus accused him of neglecting the distinction between foreknowledge and foreordination; on the other hand, he himself refused to recognize any difference between predestination to punishment and predestination to sin. At a synod held in Mainz in 848, and presided over by Rabanus, Gottschalk presented a written explanation in defense of his views; he was, however, very summarily found guilty of heresy, and handed over to his ecclesiastical superior, Hincmar of Rheims, to be dealt with as his crime might deserve. He was again condemned in an assembly at Quircy in 849—this time not only as a heretic, but also as a despiser of authority, and as a disturber of the Church's peace—and sentenced to be whipped severely and rigorously imprisoned. The place selected for his captivity was the Monastery of Hautvilliers, in the Diocese of Rheims, and here he languished throughout the remainder of his life, a period of twenty years, notwithstanding the efforts of influential friends and his own pitiful appeals. He died October 30, 868 or 869, and was buried in unconsecrated ground. Fragments of his works were published by Migne, *Patrol. Lat.*, cxxi. Consult his life by Borrasch (Thorn, 1868), and Gaudard (Saint Quentin, 1888).

GOTTSCHALK, Louis Moreau (1829-69). A famous American pianist and composer, born at New Orleans, La. At twelve years of age he took up the study of music under Hallé and Maleden, in Paris, and from 1845 to 1852 made successful tours of Continental Europe. In 1853 he returned to his native land and repeated his

foreign successes. He visited most of the important cities and towns from one end of the United States to the other, playing or conducting his own compositions. His success and the hard work entailed undermined his health, and it only needed the fatiguing tour through Cuba and Latin America, commenced in 1865, to hasten his death which occurred at Rio Janeiro. His compositions, published and manuscript, covered every branch of music, but his fame as a composer centred in his pianoforte pieces, of which there are about ninety.

GOTTSCHALL, got'shal, RUDOLPH VON (1823 —). A German critic and miscellaneous writer. He was born in Breslau and studied at Königsberg, Breslau, and Berlin. His political and social sympathies with the revolutionary movement of 1848 were shown in the dramas *Wiener Immortellen* (1848), *Lambertine von Mericourt* (1850); and *Ferdinand von Schell* (1851), as well as in his first collection of poems, *Gedichte* (1850), and in a lyric epic, *Die Göttin, ein hohes Lied vom Weibe* (1853). From this time on his work became more serene in temper and style. An epic, *Carlo Zeno* (1854), was followed by an excellent historical comedy, *Pitt und Fox* (1854), and this by literary and historical studies, whose final titles were: *Die deutsche National-Litteratur des XIX. Jahrhunderts* (1892); and *Poetik: Die Dichtkunst und ihre Formen* (1858). Noteworthy also are: *Neue Gedichte* (1858); *Mazeppa* (1859); *Reisebilder aus Italien* (1864); *Maja* (1864); *König Pharao* (1872); *Janus*, poems (1873); and *Bunte Blüten*, poems (1891). Gottschall's dramas are collected in twelve volumes (1884); his literary essays in *Portraits und Studien* (1871); *Litterarische Totenklänge und Lebensfragen* (1885); and *Studien zur neuen deutschen Litteratur* (1892). Of his many novels, the first, *Im Banne des schwarzen Adlers* (1875), is best. Gottschall was also active as an editor and compiler of anthologies.

GOTTSCHED, got'shet, JOHANN CHRISTOPH (1700-66). A noted German critic and author, who for about thirty years exercised an almost undisputed literary dictatorship in Germany. He was born near Königsberg, February 2, 1700, studied theology and especially philosophy, at the University of Königsberg, and in 1724 went to Leipzig, where his lectures on polite literature made him speedily known, and where he became professor, first of poetry (1730), then of logic and metaphysics (1734) at the university. As editor of the weeklies *Die vernünftigen Tadlerinnen* (1725-26) and *Der Biedermann* (1727), he started on his career of untiring critical activity, continued in other literary journals, all tending toward purification of the language and toward conventional forms. In 1726 he was elected senior of the Poetic Society of Leipzig, which he reorganized, and whose influence was considerably extended by him. Directing his criticism at first chiefly against the bombast and absurd affectations of the Second Silesian School, he proceeded to lay down strict laws for the composition of poetry. He was exclusively a man of reason who sought to reduce all rules of rhetoric and poetry to philosophic principles, confining himself, however, strictly to external perception, evidently incapable of fathoming the intrinsic merit of creative genius. Voiced in all his various periodicals and treatises, this tendency was especially apparent in his *Versuch einer kritischen Dichtkunst für die Deutschen* (1730 and repeatedly after). His main endeavor was directed toward the reformation of the German drama, for which he was bent upon creating a national theatre on the model of the French. Aided by his cultured wife, LUISE ADELGUNDE VIKTORIE (1713-62), a prolific writer and translator, and with the coöperation of the theatrical manager Neuber and his wife, Caroline, a clever actress, he succeeded indeed in bringing about a considerable improvement in the condition of the German stage by substituting for the prevailing operatic performances translations of French dramas and original plays, and by banishing from it forever the coarse buffooneries of the 'Hanswurst' (Jack Pudding). His own tragedy, *Der sterbende Cato* (1732), fashioned after Addison's work to serve as a model of what a true tragedy should be, and enthusiastically applauded by Gottsched's faithful followers, is a dreary and stilted production, barren of poetry and dramatic action. Growing ever more vain and dictatorial, and carrying his reforms to pedantic excess, he became involved in a violent controversy with the Swiss critics Bodmer and Breitinger, who advocated the introduction to the German public of the great English writers, especially Milton, and when, in 1748, Gottsched went so far as to belittle the rising genius of Klopstock, he drew upon himself ridicule and scathing criticism. The new literary spirit inaugurated by Lessing remained a closed book to him. Long before (1741) he had also fallen out with Caroline Neuber, regarding practical stage matters, and even placed himself in opposition to his wife. Gradually his influence and authority declined, leaving him imbittered and isolated, and thus it came to pass that this worthy man, who in his day had done yeoman service for German literature, became a by-word for foolish pedantry years before his death, which occurred at Leipzig, December 12, 1766. He left at least one important work, *Nöthiger Vorrat zur Geschichte der deutschen dramatischen Dichtung* (1757-65), a valuable repertory of information intended to embrace an account of all dramatic productions in Germany from 1450 to 1760. Consult: Danzel, *Gottsched und seine Zeit* (Leipzig, 1848); Fischer, *Gottsched und sein Kampf mit den Schweizern* (ib., 1892); and Wolff, *Gottscheds Stellung im deutschen Bildungsleben* (Kiel, 1895-97).

GÖTZ, gets, HERMANN (1840-76). A gifted German composer, born in Königsberg, Prussia. He did not begin his musical studies until his eighteenth year, and from 1860 to 1863 was a pupil at the Stern Conservatory, Berlin, where his teachers were Stern, Von Bülow, and Ulrich. Upon leaving the conservatory, he became organist of a church at Winterthur, Switzerland. Götz's place among composers is permanently established by his one opera, *Die Zähmung der Widerspenstigen*, first performed at Mannheim on October 11, 1874. In addition to some orchestral compositions, he left an unfinished opera, completed by his friend Ernst Frank, called *Francesca von Rimini*. Ill health, brought on by overwork, caused him to retire in 1870 to Hottingen, near Zurich, and he died there, December 3, 1876.

GÖTZEN, gēts′en, Friedrich, Count (1767-1820). A Prussian general, born at Potsdam. He entered the army in 1783, and was appointed major on the general staff in 1801. He had the fullest confidence of King Frederick William III., who appointed him his chief adjutant in 1804, and at whose request he was sent to organize the defense of Silesia. As Governor-General of that province, he displayed extraordinary patriotism during the critical period of the Napoleonic invasion, and was chiefly instrumental, by his skill and persistent energy, in saving that province to the Prussian Crown.

GÖTZEN, Gustav Adolf, Count von (1866—). A German traveler, born at the Castle of Scharfeneck, Silesia. He undertook a journey to the Kilimanjaro, which was highly successful, and on his second tour traversed the entire continent of Africa from Pangani, German East Africa, to the mouth of the Congo. The journey, undertaken in association with Drs. von Prittwitz and Kersting, was begun December 21, 1893, and was terminated, after almost incredible difficulties and hardships, November 29, 1894. The interesting discoveries made by Götzen on this tour are described by him in the volume entitled *Durch Afrika von Ost nach West* (1895). In 1896 he was sent to Washington as military and naval attaché, in 1900 was appointed Governor of German East Africa, and in 1901 major and commander of the defensive forces there stationed.

GÖTZENBERGER, gēts′en-bĕrg-ēr, Jakob (1800-66). A German historical painter, born in Heidelberg, pupil of Cornelius, first at Düsseldorf, then in Munich. With Förster and Hermann he painted (1832), in the Aula of the University at Bonn, the frescoes representing the Faculties, for which he had made studies in Rome and Naples in 1828. A cycle in fresco in the chapel at Nierstein, Hesse, made his reputation. He was appointed Court painter and inspector of the gallery at Mannheim, visited Paris and London with Cornelius, and in 1844 decorated the Trinkhalle at Baden-Baden with illustrations of the legends of the Black Forest. In 1847 he went to England, where he painted many portraits and some frescoes, of which those in Bridgewater House for Lord Ellesmere, and four great compositions after an old English ballad, in Northumberland Palace, are the most noteworthy.

GÖTZKOWSKI, gēts-kōv′skē, or **GOTSKOWSKI,** Johann Ernst (1710-75). A Prussian merchant and patriot, born at Konitz. In 1730 he removed to Berlin, where, supported by the patronage of the Crown, he introduced the manufacture of porcelain in 1761 at the request, it is said, of Frederick the Great. After the battle of Kunersdorf (1759), so damaging to Prussia, he used his influence with the Russian general who was laying siege to Berlin (1760), to guard the city against plundering, and to reduce the heavy tribute levied upon the inhabitants.

GÖTZ (gēts) **OF THE IRON HAND.** See Berlichingen, Götz von.

GOUDA, ĕou′dȧ (Dutch *Ter Gouw*, on the Gouw). A town of Holland, situated at the confluence of the Gouw and the Yssel, 12½ miles northeast of Rotterdam (Map: Netherlands, C 2). In the market-place stand the Late-Gothic town hall and the Church of Saint John, dating from 1485, and restored in 1552, with magnificent stained-glass windows, most of them made by the brothers Crabeth between 1555 and 1577. Gouda has a library located in the church, and a museum of antiquities. The chief industries are brick pottery and pipe-making, the Gouda pipes having formerly been very famous. Stearin candles are also manufactured here, and an active trade is carried on in dairy products and grain. The canal of Gouda connects Amsterdam with the Lek. Population, in 1889, 19,800; in 1900, 22,100.

GOUDIMEL, gōō′dē′mĕl′, Claude (c.1505-72). A famous French musician and composer of the sixteenth century, born at the town of Besançon. He is thought to have been a pupil of the celebrated Josquin Deprès (q.v.). Among his own pupils are numbered such distinguished musicians as Palestrina, Animuccia, Nanini, Bettini, Mervlo; his school in Rome (established about 1538) becoming so famous for its instruction, and the character and number of its students, as to earn for the master the sobriquet of 'father of the Roman school.' He is next heard of as a printer and publisher of music, in partnership with Duchemin, an arrangement, however, early dissolved (1555-56). Whether he was really implicated in the religious troubles of his day, or the jealousy of rivals used such an excuse to secure their ends, is not known, but he was killed at Lyons in the ghastly Saint Bartholomew massacre of August 24, 1572. His compositions were almost entirely for the Church, the Vatican Library, and also that at Vallicella, containing several masses and motets, in manuscript. Many other motets, songs, and arrangements were published during his lifetime, but perhaps his setting of the Psalms, which received the formal approval and recognition of the Sorbonne in 1561, was the most enduring.

GOUDY, gou′dī, Henry (1848—). A British jurist. He was born in Ireland, and was educated at the universities of Glasgow, Edinburgh, and Königsberg. Upon the establishment of the *Judicial Review* he became its editor, and conducted that publication until 1893. He was professor of civil law at Edinburgh from 1889 to 1893, when he was called in the same capacity to Oxford. Besides several contributions to the *Encyclopædia Britannica*, he was co-editor on the *Manual of Local Government in Scotland* (1880), and also edited the second edition of Muirhead's *Private Law of Rome* (1898). His *Treatise on the Law of Bankruptcy in Scotland* (2d ed. 1896) is regarded as a valuable contribution to that subject.

GOUGE, Thomas (1609-81). A non-conformist divine and philanthropist, born in London, September 29, 1609, the son of William Gouge (q.v.). He was educated at Eton and Cambridge, and was Vicar of Saint Sepulchre's, London (1638-62). Here he won distinction by well-directed efforts to provide work for the able-bodied poor. In 1662 he resigned his living because of the Uniformity Act, and retired to Hammersmith. In 1672 he began making semi-annual journeys to Wales for the purpose of establishing schools where English should be taught, and circulating religious books. He wrote himself several works and numerous tracts, some of which were translated into Welsh. His collected works were published in London (1706). His *Surest and Safest Way of Thriving* was reprinted, with introduction by Thomas Binney

(1856). Consult his biography by Clarke, in *Lives of Eminent Persons* (London, 1683).

GOUGE, William (1578-1653). A Puritan divine. He was born at Stratford-le-Bow, Middlesex, December 25, 1578; was educated at Eton and Cambridge; became preacher at Saint Anne's, Blackfriars, London, in 1608, and continued there till his death, December 12, 1653. He was one of the leading members of the Presbyterian party in England, sat in the Westminster Assembly, and was prolocutor of the first provincial assembly of London, in 1647. At college the strictness of his life gained him the name of the 'arch-Puritan,' and later he was affectionately known as the 'Father of the London Ministers.' As a writer he is best known by his elaborate *Commentary on the Epistle to the Hebrews* (1655), to which is prefixed a life by Thomas Gouge.

GOUGH, gŏf, Hugh, Viscount (1779-1869). An eminent British soldier, born at Woodstone, Ireland. He joined the British Army in 1794; served at the Cape of Good Hope in 1795, and in the Peninsular War (1809-13); became a major-general in 1830; and in 1837 went to India. He commanded the land forces in the Opium War of 1840-42, compelling the Chinese to sign the Peace of Nanking. In 1843, as commander-in-chief of the forces in India, he routed the Mahrattas at Maharajpur, and for his brilliant victories at Mudki, Firozshah, Aliwal, and Sobraon in the first Sikh War (1845-46) was given a peerage. In the Second Sikh War (1848-49) he was again successful, achieving the victory of Gujarat, following upon an indecisive battle at Chillianwalla; but the heavy losses of the English brought criticism upon him, and he was superseded by Sir Charles Napier. Gough was created a viscount and was pensioned in 1849, and in 1862 became field-marshal.

GOUGH, John Bartholomew (1817-86). A well-known American temperance lecturer. He was born in Kent, England, but at the age of twelve went to America as an apprentice, and worked on a farm in Oneida County, N. Y. In 1831 he went to New York City, where he was engaged in bookbinding; but habits of dissipation lost him this employment, and reduced him to that of giving recitations and singing comic songs at grog-shops. He was married in 1839; but his drunken habits reduced him to poverty and delirium tremens, and probably caused the death of his wife and child. A benevolent Quaker induced him, in 1842, to take the pledge; and he attended temperance meetings and related his experience with such effect as to influence many others. Some time after signing the pledge he had a short relapse into drunkenness; but an eloquent confession restored him to favor, and he lectured in various parts of America with great success. In 1853 he was engaged by the London Temperance League to lecture two years in the United Kingdom, where he drew large crowds by his earnest, and, by turns, amusing and pathetic, orations. From this time onward until his death he continued to lecture, for the most part on the question of temperance, and uniformly drew large crowds. He published: *An Autobiography* (1846); *Orations* (1854); *Temperance Addresses* (1870); and *Sunlight and Shadow: or, Gleanings from My Life Work* (1880).

GOUGH, Richard (1735-1809). An English antiquary, born in London, and educated at Cambridge. He was director of the Society of Antiquaries of London from 1771 to 1797. As a result of his extensive travels, he published the works entitled: *British Topography* (1780); *Sepulchral Monuments of Great Britain* (1786-99); *History of the Society of Antiquaries* (1770); *A Catalogue of the Coins of Canute, with Specimens* (1777); and *An Essay on the Rise and Progress of Geography in Great Britain and Ireland, Illustrated with Specimens of Our Oldest Maps* (1780). Noteworthy also is his excellent edition of Camden's *Britannia* (2d ed. 1786), which embodies the results of explorations extending over a period of more than twenty years.

GOUJON, gōō'zhôn', Jean (1520?-72?). The greatest sculptor of the Renaissance in France. He was also an architect, although, as he always worked in conjunction with great architects, it is not possible now to determine how much of the architecture of his works belongs to him. The leading quality of his work is its architectonic quality—the absolute harmony which prevails between it and the architecture which it decorates. Goujon's figures show a peculiar flavor of preciosity characteristic of the period and his personality.

Goujon's origin is entirely unknown. A contract for two columns supporting the organ of the Church of Saint-Maclou, at Rouen, dated August 9, 1541, bears his name, and points to Normandy as his native country. In the porch of this church are two carved wooden doors of great beauty, which are definitely in the style of Goujon, although there is no proof that they were made by him. A record of 1542 ascribes to him the statue of the Archbishop Georges II. d'Amboise, on the monument of the Cardinal Georges I. d'Amboise, in the Cathedral of Rouen. When the Archbishop became cardinal this statue was replaced by the present one. It has been conjectured that Goujon was employed on the monument to Louis de Brézé in the cathedral.

Goujon's long association with the great architect Pierre Lescot begins about 1541, when they accomplished together the restoration of the Church of Saint-Germain-l'Auxerrois, in Paris. Two of the bas-reliefs have been preserved in the Museum of the Louvre. Goujon was employed in 1545-46 by the Constable de Montmorency in the decoration of his château at Ecouen. The bas-reliefs of the Hôtel Carnavalet are ascribed to the year 1547. Goujon erected an extraordinary loggia with fountains at the corner of the old Cemetery of the Innocents, in the Rue aux Fers, Paris. When the cemetery was discontinued (June 19, 1786), this charming work, bas-reliefs of the nymphs of the French rivers, was rearranged in a public square, and is still called the Fountain of the Innocents. Probably about 1550 to 1553 Goujon was employed at the château of Arrêt, under Philibert de l'Orme. The fine group of Diana and a stag which decorated one of the courts of this château is now in the Museum of the Louvre. From 1546 until the end of his life Goujon was associated with Pierre Lescot in the construction and decoration of that portion of the Louvre which was built by Henry II. at the southwestern angle of the old Louvre quadrangle. The figures on the sides of the round windows are notable. The most beautiful and important part of his

work on the Louvre is the gallery for musicians, which stands in the hall now occupied by a part of the Museum of Antiquities. The four caryatides which support this gallery may be compared with the caryatides of the Erechtheion at Athens. The date of the last one is September 6, 1562. Goujon, like most of the great artists of his day, was a Huguenot. There is a tradition that he was killed in the massacre of Saint Bartholomew (August 24, 1572).

Consult: Gonse, *La sculpture française depuis le XIVème siècle* (Paris, 1895); Palustre, *La renaissance en France*, vol. ii. (ib., 1881); Lami, *Dictionnaire des sculpteurs de l'école française* (ib., 1898); Pattison, *The Renaissance of Art in France*, vol. i. (London, 1879); Bauchal, *Nouveau dictionnaire biographique et critique des architectes français* (Paris, 1887); and Montaiglon, "Jean Goujon et la vérité sur la date de sa mort," in *Gazette des Beaux-Arts* (Paris, 1895).

GOULBURN, gōl'bŭrn. A city in New South Wales, Australia, 120 miles southwest of Sydney, on the left bank of the Wollondilly River, and on the Great Southern Railroad (Map: Australia, H 5). Gold and copper are found near by, and there are tanneries, boot and shoe factories, flour-mills, and breweries; but the main business of the region is agriculture. The town is well built, and owns gas and water-works. Population, in 1891, 10,916; in 1901, 10,680.

GOULBURN, Henry (1784-1856). An English statesman. He was born in London, was educated at Trinity College, Cambridge, and entered Parliament in 1808. Four years later he became Under-Secretary for War and the Colonies, and was one of the peace commissioners at the close of the war with the United States (1814). His further political appointments were: Member of the Privy Council and Secretary to the Lord Lieutenant of Ireland (1821); Chancellor of the Exchequer under the Duke of Wellington (1828); Home Secretary (1835); and Chancellor of the Exchequer in the Cabinet of his intimate friend Sir Robert Peel (1841). He retired from the Government in 1847, but represented Cambridge University in Parliament until his death, and was highly respected by all parties throughout his disinterested, honorable career.

GOULD, gōōld, Augustus Addison (1805-66). An American zoölogist, born at New Ipswich, N. H., April 23, 1805. He graduated at Harvard in 1825, and took his medical degree five years later. He was an instructor in botany and zoölogy at Harvard for two years, and practiced medicine in Boston. He was one of the leading conchologists of his time, and was one of the most active naturalists in America. He published: a *System of Natural History* (1833); *The Invertebrate Animals of Massachusetts* (1841); *Principles of Zoölogy*, with L. Agassiz (1848).

GOULD, Benjamin Apthorp (1787-1859). An American educator, born at Lancaster, Mass. He graduated at Harvard in 1814, and was principal of the Boston Latin School from that time until 1828, when the failure of his health compelled him to resign. He prepared for the school several text-books, including *Adam's Latin Grammar* (1825), and editions of Latin classics.

GOULD, Benjamin Apthorp (1824-96). An American astronomer, born in Boston, Mass. He graduated at Harvard in 1844, and at Göttingen (Ph.D.) in 1848; established the *Astronomical Journal* in 1849, continued it until 1861, and resumed its publication in 1885. In 1852 he was appointed director of the longitude determinations of the Coast Survey, and in 1867, after having organized and greatly developed this service, retired. From 1855 to 1859 he was director of the Dudley Observatory, at Albany, N. Y., and in 1866 he established, by means of the Atlantic cable, the relations in longitude between American and European stations. From 1865 he was much interested in the study of the southern celestial hemisphere, and in 1870 established at Córdoba, Argentina, the National Observatory, where he accumulated the material for his *Uranometría Argentina* (1874) and *Catálogo de Zonas Estelares* (1884), both classic in the literature of astronomy. In 1872, with the assistance of the Argentine Government, he further established a system of meteorological stations extending southward to Tierra del Fuego and eastward to the Atlantic. He returned to the United States in 1885. He was a charter member of the National Academy of Sciences, was elected president of the American Association for the Advancement of Science in 1868, and was the recipient of many foreign distinctions. His contributions to the scientific knowledge of the southern celestial hemisphere must be regarded as having marked an epoch in the modern study of astronomy.

GOULD, George Jay (1858—). An American capitalist, born in New York City, the first son of Jay Gould. He was privately educated, and afterwards assumed control of large railway interests. In 1888 he became president of the Little Rock and Fort Smith Railway; in 1893 of the Saint Louis, Iron Mountain and Southern, the International and Great Northern, and the Missouri Pacific. He was also elected president of the Manhattan Elevated Railway of New York City in 1892.

GOULD, Hannah Flagg (1789-1865). An American author, born at Lancaster, Mass. She wrote extensively for magazines and newspapers, and some of her verses were at one time very popular. They are simple and pleasing, with a decided moral tone. A volume of her poems appeared in 1832, a second in 1836, and a third in 1851. Among her other works are: *Gathered Leaves*, prose sketches (1846); *The Diosma*, composed partly of original and partly of selected poems (1850); *The Youth's Coronal* (1850); *The Mother's Dream* (1853); and *Hymns and Poems for Children* (1854).

GOULD, Helen Miller (1868—). An American philanthropist, born in New York City, the eldest daughter of Jay Gould. At the commencement of the Spanish-American War she presented $100,000 to the United States Government, and during the war, as a member of the Women's National War Relief Association, was prominently active. She gave $50,000 for necessary supplies for the care of soldiers in hospitals, and at Camp Wyckoff, near Montauk Point, Long Island, did personal work in that connection. Her benefactions to New York University have also been notable, and include the library building of the university, with its well-known "Hall of Fame." She has also given largely to Rutgers College, and at a cost of

$50,000 built and equipped the Sailors' Young Men's Christian Association building in Brooklyn (New York City).

GOULD, JAMES (1770-1838). An American jurist, born in Branford, Conn. He graduated at Yale in 1791, was admitted to the bar in 1798, and thereafter almost continuously until 1833 was connected with the famous Litchfield Law School (see REEVE, TAPPING), first as professor, and from 1820 to 1833 as superintendent. From 1816 to 1818 he was a justice of the Connecticut Supreme Court. He published *Principles of Pleading in Civil Actions* (1832), a new edition of which was published at Albany, N. Y., in 1887.

GOULD, JAY (1836-92). An American capitalist, born in Roxbury, Delaware County, N. Y. He passed his boyhood on his father's farm, and was educated at Hobart Academy. In 1852 he entered a hardware store which his father had established, but although he did not neglect the business, his evenings were devoted to the study of surveying, at which he spent the years from 1852 to 1856, preparing and publishing maps of Albany and Delaware counties, of various counties in Ohio and Michigan, and of a proposed railway from Newburg to Syracuse. In 1856 he published a *History of Delaware County*. In the same year he engaged in the lumber and tanning business in western New York, selling out just before the panic of 1857, and removing to Stroudsburg, Pa., where he became the controlling director in a small bank. It was shortly after this that he first became interested in railroading. In the great financial depression following the panic of 1857 he disposed of his bank stock and bought a controlling interest in the Rutland and Washington Railroad running from Troy, N. Y., to Rutland, Vt., for 10 cents on the dollar. Of this company he became president, treasurer, and general manager, and subsequently brought about a consolidation of his road and the Rensselaer and Saratoga Railroad. In 1859 he sold out his stock in the consolidated roads at 120, and removed to New York, where he embarked in the brokerage business. He made a special study of railway stocks, and set out to obtain control of the Erie Railroad, then in financial straits, and the object of strife between the Drew and Vanderbilt interests. By methods new in railway speculation, Gould secured control of the road, and in 1868 was elected its president. His administration of the road may, as he asserted, have reclaimed it from bankruptcy, but it saddled it with a debt of $64,000,000, and resulted in its paying no dividends until 1891. The manipulation of the Erie was the first of a long series of speculations by which Gould obtained the mastery of some of the greatest railway corporations in the country. His method of obtaining control was the same in almost every instance: to depress the value of the stock which he sought to control, and acquire the property during the period of depression. By these methods in the next few years he obtained control of the Union Pacific, which he held from 1873 to 1883, during which time the value of its stock rose from 15 to 75, and it became for the first time a dividend-paying road; of the Missouri Pacific, which under his management and by consolidation and extension developed from a short line 287 miles long with earnings of $280,000 a month, to an immense system with earnings, before his death, stated at $5,100,000 a month; of the Wabash, the Texas Pacific, the Saint Louis and Northern, and the Saint Louis and San Francisco. In 1880 he controlled fully 10,000 miles of road, more than one-ninth of the mileage of the country. Gould also consolidated competing telegraph lines into the Western Union system in 1881, and obtained control of the Manhattan Elevated Railroad in the same year. What has been considered the most indefensible of all his actions was his entering with 'Jim' Fisk, who was also his partner in some of his railroad deals, into a scheme to corner the gold market, which resulted in the disastrous 'Black Friday' panic of 1869.

GOULD, JOHN (1804-81). An English ornithologist, born at Lyme Regis. He was at first a gardener at Ripley Castle (Yorkshire), and in 1827 was appointed taxidermist to the Zoölogical Society of London. In 1832 he published his *Century of Birds from the Himalayan Mountains*, based on a collection of bird-skins obtained from that region, and containing eighty plates from drawings by himself which were the most accurate illustrations of foreign birds published in England up to that time. He was elected a fellow of the Royal Society in 1843. His works include forty other volumes, with careful plates. The most important of them are *The Birds of Australia* (7 vols., 1840-48), with 601 plates, material for which was largely collected on a scientific journey to that continent and the adjacent islands; a *Monograph of the Trochilidæ* (humming-birds) (1849-61), with 360 plates, derived principally from his own exceedingly important collection; and *The Birds of Great Britain* (5 vols., 1862-73), with 367 plates. He was distinguished equally as an artist and a naturalist, and as his own publisher was very successful. His Australian birds are in the Academy of Natural Sciences of Philadelphia.

GOULD, SABINE BARING-. See BARING-GOULD, SABINE.

GOULD, THOMAS R. (1818-81). An American sculptor, born in Boston. He modeled his first figure in the studio of a Boston sculptor, Seth Cheney, in 1851. He practiced his profession in Boston until 1868, when he established a studio in Florence, Italy. Among his works are ideal busts of "Christ" and "Satan" (executed before 1868); the "West Wind," which was supposed to resemble Canova's "Hebe"; portrait busts of Emerson, John A. Andrew, and the elder Booth, and a statue of John Hancock in the town hall of Lexington. Consult Tuckerman, *Book of the Artists* (New York, 1867).

GOULDING, gōōl'dĭng, FRANCIS ROBERT (1810-81). An American author. He was born at Roswell, Ga., and was educated at the University of Georgia and at the Presbyterian Theological Seminary, Columbia, S. C. His story for boys, *Robert and Harold, or the Young Marooners on the Florida Coast*, first published in 1852, and afterwards frequently reprinted, became very popular. In 1865 he was compelled to abandon the pulpit because of ill health, and thenceforth devoted himself to writing. His other stories include: *Marooner's Island* (1868); *Frank Gordon* (1869); and *Woodruff Stories* (1870).

GOUNOD, gōō'nō', CHARLES FRANÇOIS (1818-93). A distinguished French composer of sacred and dramatic music. He was born in Paris June 17, 1818, the son of an eminent painter and en-

graver, who died in 1823, leaving his widow and family in comparative poverty. In his autobiographical *Memoirs*, published in 1895, Gounod ascribes all his artistic success to the training and influence of his mother, who was a woman of remarkable character, as well as an accomplished musician, and who more than any one else laid the foundation of his future greatness as a composer. At eighteen he entered the Paris Conservatory, after a probationary period in the Lycée Saint Louis. At the Conservatory his masters were Reicha, Halévy, Lesueur, and Paër, and at the end of his first year he won the second Prix de Rome with the cantata *Marie Stuart et Rizzio*. In 1839 he won the Grand Prix de Rome, obtaining twenty-five votes out of twenty-seven. Always of a devout disposition, his stay in Rome and his studies in ecclesiastical music, particularly that of Palestrina, served to emphasize the religious tendency of his nature, and there is little doubt that on his return to Paris he would have entered the Church had not his affection for his mother been in the way. His first appointment was as organist and precentor of the Missions Etrangères, Paris, where for five years little was heard of him until he was discovered through the public presentation of one of his compositions. In 1849 Mme. Viardot, then at the zenith of her fame, asked Gounod, who was visiting her, why he did not write an opera, and upon his reply that he would do so gladly if he had a libretto, bade him go and see the celebrated Augier and say that if he would write the book she herself would sing the principal part. Augier, delighted with the proposition, immediately commenced work, and *Sappho* was the result (1851). Although not a success, the work earned for its composer a solid reputation. *Ulysse* followed in 1852, shortly after his marriage to a daughter of Zimmerman, a professor at the Conservatory. He became superintendent of instruction in singing to the communal schools of Paris, and also director of the choral society connected with them, succeeding Hubert, the original founder of the society. The experience gained in this employment was of inestimable value to him, in that he learned to direct and utilize large masses of vocal sound so as to develop the mechanism of sonority, under very simple methods of treatment. *La nonne sanglante*, an opera in five acts, written in 1852, presented in 1854, and performed only eight times, was his next work, its failure proving a great disappointment to him. *Saint Cecilia's* mass, performed for the first time in 1855, by the Association of Artist Musicians, filled in the interval between *La nonne sanglante* and *Faust*, and of all his masses this has been the most popular. In 1856 he made the acquaintance of Barbier and Carré, who agreed to supply the libretto of *Faust*; but by the time it was half finished a difficulty arose which precluded an immediate presentation, and Carvalho, who was to stage the new opera, asked that instead Gounod would write a comic opera, taking the subject from Molière. *Le médecin malgré lui* was accordingly written, its success being immediate and complete. A melodrama, *Faust*, had meanwhile been given at a rival theatre, with but little success, and the collaborators returned to their work on their own half-finished opera of *Faust*, which was produced on March 19th. It did not meet with immediate approval, but has subsequently come to be regarded as the composer's operatic masterpiece, stamping him as one of the world's greatest musicians. *Roméo et Juliette* (1867) is, however, regarded by French critical opinion as of greater musical value than *Faust*. Smaller and less successful compositions were the following: *Philémon et Baucis* (1860); *La Colombe* (1866); *La reine de Saba* (1862); *Mireille* (1864). His sojourn in England during the Franco-Prussian War was as profitable to him as it was beneficial to the cause of music in England. He formed the Gounod Choir, a choral society of mixed voices, which gave very successful concerts. To this period belong *Gallia*, a small cantata of enduring merit, and the *entr'acte* music to several stage productions. His great oratorios, *The Redemption*, and *Mors et Vita*, are standard. Gounod's music is marked by intense spirituality and power, and while his vocal and choral work alone would rank him with the highest, his genius is more clearly shown in his orchestration. He died in Paris October 18, 1893. There are many good biographies of Gounod, apart from his own memoirs, the most comprehensive of which is Claretie, *Portraits contemporains* (Paris, 1875). Consult also Voss, *Ein Lebensbild* (Leipzig, 1895).

GOUPIL, gōō'pêl', Jules Adolphe (1839-83). A French painter, born in Paris. He was the son of Adolphe Goupil (1806-93), the well-known picture dealer, who had branches of his Paris house in Berlin and New York, and did much to introduce French art into America. The younger Goupil was a pupil of Ary Scheffer and an excellent genre and portrait painter. Among his works are "Visite à la jeune mère" (1865); "Les accordailles" (1874); "Le dernier jour de captivité de Mme. Roland" (1880) in the Luxembourg, and the portraits of Arthur Picard and Camille Sée.

GOURA, gōō'rä (Neo-Lat., from the native name). A genus of remarkable fruit-eating pigeons, by far the largest of the family, and natives of Java, New Guinea, and other islands of the Indian Archipelago. The best known (*Goura coronata*) is two feet four inches in length, and is a very beautiful bird, of a grayish-blue color, with parts of the back and wings black and purplish-brown, and with a broad white bar across the wings. The head is adorned with a large semicircular crest of narrow straight silky feathers, always carried erect. Gouras are in the highest esteem for the table, but attempts to introduce them into the poultry-yards of Holland have completely failed. Three species are recognized.

GOURAMI, gōō'rä-mī (Javanese name). An excellent fish (*Osphromenus olfax*), native in the rivers and brackish waters of China and the East Indian Archipelago, which has a deep oval, compressed body, large scales, and long dorsal and anal fins. The first ray of the ventral fins is prolonged backward as a long filament. The fish grows three to five feet long, though the usual size averages below this, and is greenish-brown obscurely banded with vertical stripes. It is one of the nest-building fishes, and at the breeding season forms its nest by entangling the stems and leaves of aquatic grasses. Both the male and female watch the nest for a month or more with careful vigilance, and violently drive away every other fish which approaches, till the

spawn is hatched, afterwards affording a similar parental protection to the young fry.

This fish is usually regarded as the best table fish of Eastern waters, and has been artificially cultivated for a long period in tanks, etc., by the Malays and Dutch of the East Indies. It is hardy and omnivorous, and was long ago carried to India, Mauritius, Australia, and even to the French West Indies, thriving well in all these places and multiplying in the local streams.

GOURD, gōrd *or* gōōrd (Fr. *gourde,* Port. *cougourdo,* It. *cucuzza,* from Lat. *cucurbita,* gourd). The name gourd, or its equivalent, as employed in Europe includes squashes and pumpkins, but in America it is confined largely to the inedible hard-shelled fruits of certain members of the family Cucurbitaceæ. The more common American gourds are Lagenaria vulgaris and some small egg and pear shaped ornamental fruits belonging to Cucurbita pepo, var. ovifera. The former is a rampant climbing vine, which finds considerable use as a cover for unsightly places. On account of their shapes, the fruits are frequently used for dippers, bottles, or dishes, after their contents have been removed and they have been soaked to get rid of the bitter principle. These and smaller ornamental gourds are all of the easiest culture, requiring about the same treatment as do squashes. See BOTTLE-GOURD; CALABASH GOURD; CUCUMBER. See Plate of CUCUMBER ALLIES.

GOURD FAMILY. See CUCURBITACEÆ.

GOURDSEED. A local name in the Western United States for the Missouri or black-horse sucker (*Cycleptus elongatus*). See SUCKER.

GOURGAUD, gōōr'gō', GASPARD, Baron (1783-1852). A French general, born at Versailles. After serving with distinction in the various campaigns of Napoleon from 1805 until 1813, he was appointed his adjutant-general. He accompanied Napoleon to Saint Helena, but was compelled for political reasons to leave the island in 1818, after he had assisted Napoleon in preparing his *Mémoires.* In 1832 he became aide-de-camp to Louis Philippe, and in 1841 was appointed to the House of Peers. His principal publications are: *La campagne de 1815* (London, 1818); *Mémoires pour servir à l'histoire de France sous Napoléon, écrits à Saint Hélène sous la dictée de l'empereur* (8 vols., London and Paris, 1822-4); and *Réfutation de la vie de Napoléon par Sir Walter Scott* (2 vols., Paris, 1827).

GOURGUES, gōōrg, DOMINIQUE DE (1530-93). A French soldier and adventurer, born in Mont-de-Marsan, Gascony. In his youth he served in Italy with the French armies under Maréchal de Strozzi and in 1557 was captured by the Spanish at Siena. He was condemned to the galleys, where he was still serving, two years later, when his ship was captured by the Turks. The change of masters brought no immediate relief, and he was still kept at the oar, until the vessel fell in turn into the hands of the Knights of Malta, by whom he was set at liberty. His rough life had bred in him a love of adventure, and in the next few years voyages to Africa, to Brazil, and other far-off regions increased his experience, and won for him renown as a leader of men and a sailor. He returned to France at a time when reports of a tragedy on the other side of the globe were stirring the blood of all Frenchmen and of French Huguenots in particular. This was the story of how the year before (1565), although France and Spain were at peace, Menendez (q.v.) and a Spanish force had descended upon the French Huguenot settlement of Jean Ribault at Fort Caroline on the Florida coast, had massacred the greater part of the colonists, and had afterwards hung a large body of Ribault's followers under a placard, which read, "Not as to Frenchmen, but as to Heretics." Gourgues planned to wreak vengeance with his own hands. He sold his family estate, borrowed all the money he could, and fitted out three small ships, manned with 80 sailors and 150 arquebusiers, for the ostensible purpose of kidnaping negroes in Africa. Sailing in August, 1567, to the coast of Benin (Africa), he secured a cargo of negroes with which he sailed across the Atlantic, and which he sold to the Spaniards in the West Indies. He landed near the mouth of the Saint John's River, on which Fort San Mateo stood, and found willing allies in Chief Satouriona and his tribe of Indians, who had suffered much at the hands of Menendez. Gourgues and his allies descended at once on the two small forts which the Spanish had built at the entrance of the Saint John's, and after destroying their garrisons, attacked Fort San Mateo itself the next day. Such of the Spaniards as had not been killed in the assault were hung on the very trees upon which they had hung their captors' fellow countrymen, and over their heads was placed a pine board, whereon was written, "Not as to Spaniards, but as to Traitors, Robbers, and Murderers." The fortifications were razed, and Gourgues set sail for France, arriving at La Rochelle on June 8, 1568, where he was received with honor and rejoicing. Consult: Basanier, *L'histoire notable de la Floride* (1586), which was translated and published by Hakluyt in 1587 as *Notable History,* and reprinted in French's *Historical Collections of Louisiana and Florida* (1869); also Parkman, *Pioneers of France in the New World* (1865); and Gaffarel, *Histoire de la Floride française* (1875).

GOURKO, gōōr'kō, OSSIP VLADIMIROVITCH. See GURKO.

GOURNAY, gōōr'nā', JACQUES CLAUDE VINCENT DE (1712-59). A French political economist, born at Saint-Malo. He received his first instruction in political economy from his father, and subsequently traveled in Spain, Germany, England, and Holland. His views are those of a liberal commercial 'physiocrat,' approaching those of Adam Smith. The saying, "laissez faire, laissez passer," is attributed to him. His writings include: *Brèves considérations sur le commerce et l'intérêt de l'argent;* and *Considérations sur le commerce, les compagnies, sociétés et maîtrises.*

GOUROFF, gōō'rōf', real name JARDY DUGOUR (1766-1840). A Franco-Russian author. He was born at Clermont-Ferrand, of Russian extraction. After acting as director of the Collège de la Flèche until the outbreak of the Revolution, he went to Russia, where he adopted the name of Gouroff, and successively became professor at Kharkov and Saint Petersburg. His literary productions include: *Mémoire justificatif pour Louis XVI.* (1792-93); *Mémoires sur les Tatares Nogaïs* (1816); *De l'influence des lumières sur la condition des peuples* (1826); and *Essai sur l'histoire des enfants trouvés depuis les temps les plus anciens jusqu'à nos jours,* an interesting work later embodied in the publica-

tion entitled *Recherches sur les enfants trouvés*, etc. (1839), which contains statistics on illegitimacy in Europe, Asia, and America.

GOURVILLE, goor'vel', JEAN HÉRAULT DE (1625-1703). A French political agent, born at La Rochefoucauld. He entered the service of the Abbé de la Rochefoucauld, went to Paris with him, and there became secretary to the Prince de Marsillac (1646). From that time he was deep in all the political intrigues of the day. During the wars of the Fronde he attached himself particularly to Condé. By various means he had enriched himself considerably, so that when condemned to lose his fortune through confiscation after the fall of Fouquet, he escaped to England, and finally settled in Brussels. In 1667 he was able to be of service to France at the Congress of Breda, and afterwards was employed in political missions until he obtained the official pardon necessary before he could return to Court. The last years of his life were spent in the best of the literary society of the time. He left some *Mémoires* (1724).

GOUT (from OF. *goute, goutte,* It. *gotta,* drop, gout, from Lat. *gutta,* drop). A term first used by Radalphus in the thirteenth century, who taught that gout was caused by a humor that flowed drop by drop into the joints. The very numerous references to the disorder, not only in the medical writings of Hippocrates, Galen, Aretæus, Cælius, Aurelianus, and the later Greek physicians, but in such purely literary works as those of Lucian, Seneca, Ovid, and Pliny, show not only the frequency, but the notoriety of the disease. It is caricatured by Lucian in his burlesque of *Tragopodagra* in language quite applicable to the disease as now observed; while the connection of it with the advance of luxury in Rome is recognized by Seneca in the remark that in his day even the women had become gouty, thus setting at naught the authority of physicians, who had asserted the little liability of women to gout. Pliny likewise remarks upon the increase of gout, even within his own time. Ovid and Lucian represent gout as mostly incurable by medicine; from this view of it Pliny dissents. The list of quack remedies given by Lucian is one of the most curious relics of antiquity. Gout is both a local disorder and a general perversion of nutrition. Consequent upon imperfect oxidation, there is found an excessive formation of uric acid, fats, and fatty acids, instead of water, carbonic acid, and urea. Sometimes there is an excess of unoxidized sugar. The disease is a special manifestation of a tendency called the arthritic diathesis. (See DIATHESIS.) Baldness, pityriasis, acne, eczema, urticaria, prurigo, asthma, catarrhal inflammations of mucous membranes, varicose veins, hemorrhoids, and neuralgia are often resultants of the same perversion of nutrition that in some cases results in gout. Iritis and irido-choroiditis are the most common of the gouty inflammations of the eye. The external and middle ear, too, suffer from gout. Biliary lithiasis, visceral calculi, diabetes, obesity, hemicrania, and arthritis deformans are among the morbid affinities of gout. Gout is hereditary; and in some gouty families functional nervous diseases are very common among the descendants (especially the females) of gouty ancestors. But diet and mode of life are far more potent factors than heredity in its causation. Some families ascribe to heredity diseases that are actually due to living under the same faulty conditions of hygiene and dietetics, whereby a morbid predisposition becomes established. Gout has disappeared from many localities in Europe step by step with the growth of temperance and the acquisition of hygienic knowledge.

Acute gout, however, followed by uratic deposits in the joints, is frequently transmitted in families. It is almost always a disease of adult age. Of the first attacks of gout in 515 cases (among Scudamore's statistics), one occurred at eight years, 57 between twenty and twenty-five years, 85 between twenty-five and thirty years, 105 between thirty and thirty-five years, 89 between thirty-five and forty years, 64 between forty and forty-five years, 54 between forty-five and fifty years, 2 at sixty-six years. Women are far less liable to acute gout than men. The character of food largely determines the amount of urea and uric acid produced in the body, and nitrogenous food is provocative of gout. Active muscular exercise and avoidance of great intellectual exercise, avoidance of grief or anger, or disturbance of psychical balance, are valuable preventives of attacks, even in those who inherit the gouty tendency. Change of season favors gouty outbreaks, the spring and autumn furnishing a large proportion of cases. Climate is a determining, though not decisive, cause. The free perspiration induced in warm countries is a safeguard against gout. Inhabitants of subtropical and temperate regions suffer from latent gout and the allied disorders connected with the arthritic diathesis, independently of their dietetic errors. Thus, calculous disorders are frequent in Central Asia, and 'uric acid diathesis,' or 'lithæmia,' is prevalent all through the United States.

Pathologically, gout is characterized by the presence of an excessive amount of uric acid in the blood and the deposition of uric-acid salts in the tissues. The most common seat of deposits is the articular cartilage of the first joint of the great toe, but other articular cartilages may also be involved, as may also the cartilages of the eyelids, larynx, and ears, and the ligaments of joints. The deposit incrusts or infiltrates the cartilage, and if ulceration of the overlying skin takes place, may appear on the surface as the so-called 'chalk-stones.' According to Ebstein, the primary changes in the joints are those of a local necrosis due to the excess of urates in the blood. Sclerotic conditions in the arteries and kidneys are quite common, and deposits of urates in the latter may occur. Hypertrophy of the heart is often associated with the arterial changes. As to the cause of the accumulation of urates in the system in gout we are uncertain. It may be due to defective elimination of urates or to local conditions which favor their deposition. A typical attack of acute gout presents the following symptoms: After some weeks of previous indigestion, attended with flatulent swelling and a feeling of weight, rising to a climax in spasms of the thighs, the patient goes to bed free from pain, and having had rather an unnaturally strong appetite the day before. In the middle of the night he is awakened by a pain in the great toe, or sometimes in the heel, the ankle, or the calf of the leg. The pain resembles that of a dislocated bone, and is accompanied by a sense as if water not perfectly cold were poured over the

affected limb; to this succeeds chilliness, with shivering, and a trace of feverishness, these last symptoms diminishing as the pain increases. From hour to hour, until the next evening, the patient suffers every variety of torture in every separate joint of the affected limb; the pain being of a tearing, or crushing, or gnawing character, the tenderness such that even the weight of the bedclothes, or the shaking of the room from a person's walking about in it, is unbearable. The next night is one of tossing and turning, the uneasy limb being constantly moved about to find a better position; till toward morning the victim feels sudden relief, and falls over into a sleep, from which he wakes refreshed, to find the limb swollen, the venous distention usually present in the early stage having been succeeded by a more general form of swelling, often with itching between the toes, and a peeling-off of the cuticle. This individual attack may be repeated many times in the course of what is termed 'a fit of the gout,' which commonly extends over a period of weeks, or even months, before the patient is completely relieved; or the attacks may occur in both limbs, or in several other parts of the body in succession, the real termination of the 'fit' being at last indicated by an apparently complete restoration of health, and even, in some cases, by a period of improved condition and capacity for exertion, as compared with the state of the patient before the attack. In this form, acute gout might almost be called a local disease; although the connection of the attacks with deranged digestion, or with the other morbid affinities already described, and the obvious relief obtained after a sharp attack, from the symptoms of constitutional suffering, point to a cause of the disease operating over a larger range of functions than those included in the ordinary local manifestations at this period. Regular gout, accordingly, forms only part of a nosological picture, in which the so-called irregular forms have to be included before it can be said to be at all complete.

The joints which have been repeatedly the seat of the regular paroxysm become more or less permanently crippled and distorted. The patient is laid up more or less permanently in his armchair; and exercise, the great natural specific remedy of the gouty, is denied by the very conditions of the diseased state. Then follow aggravations of all the constitutional troubles. Indigestion continues or becomes constant, assuming the form chiefly of acidity after meals; the liver becomes torpid, the abdomen corpulent, the bowels disposed to costiveness; the kidney fails to perform its functions satisfactorily, and not unfrequently there is a tendency to gravel and calculus (q.v.); the heart is affected with palpitations, or fainting occurs, sometimes with spasmodic attacks of pain; the arteries become the seat of calcareous deposits, and the veins are varicose in the limbs and in the neighborhood of the rectum (see PILES); the temper is singularly irritable, and often morose; then, sooner or later, the appetite fails or is only kept up by very stimulating and unwholesome diet, with an excess of wine or of alcoholic liquors; in the end, the body emaciates, the organs and viscera functionate feebly, and premature old age rapidly supervenes. Sometimes the end is sudden, as by cerebral hemorrhage, uræmia, dropsy from the heart condition, or gouty kidney (interstitial nephritis). Uric acid in a certain excess has been shown by Garrod, and subsequently by Alexander Haig, to be characteristic of the blood of the gouty, although a minute amount of this substance is probably present even in perfect health. The most recent speculations, accordingly, tend to connect the gouty predisposition either with an excessive formation or a checked excretion of this important substance, the product, as physiology teaches, of the vital disintegration of flesh and other food, after these have subserved the daily wants of the system. The cure of gout demands the careful consideration of all its predisposing causes in the individual, and the strict regulation of the whole life and habits accordingly, from the earliest possible period. The amount of meat food and sugar must be lessened, and milk and vegetables must constitute the diet. In old people, fruit acids must be avoided, wine and malt liquors must be absolutely prohibited, and large quantities of pure water must be imbibed. In some cases very small quantities of distilled spirits do not harm a patient who is taking no nitrogenous food but milk. Tea, coffee, and cocoa must be forbidden. The following diet list has been prepared by Haig, from whom it is quoted, with slight abridgment:

"*Breakfast.*—A large soup plate half full of porridge, eaten with milk and salted. A few mouthfuls of eggs, prepared in various ways; or some mushrooms, tomatoes, or other vegetables, and occasionally fish. One or two rounds of bread, or its equivalent in toast or scones, with plenty of butter. A cup of milk, previously boiled, and flavored with tea, coffee, or cocoa. Finish with a small quantity of any fruit that is in season.

"*Lunch.*—Potato and one other vegetable, cooked in various ways, eaten with butter, fat, or various sauces. Pudding; tart or stewed fruit. Biscuit and butter, with cheese in considerable quantity. A little fruit as at breakfast. For drink, a little milk, which in winter is often warm; or water, often taken in summer, with a little fruit syrup, such as lime-juice cordial.

"*Afternoon Tea.*—Bread and butter and cake of various kinds. A little milk and water flavored with tea.

"*Dinner.*—Soup made without meat stock. Fish, or an egg, or a small bit of meat, is occasionally substituted for it. Two vegetables, with sauces, butter, or fat. Any ordinary pudding, tart, or stewed fruit. Biscuit and butter, and perhaps cheese, if the quantity of fish or egg has been small. A good supply of various fruits for dessert. For drink, water with fruit syrup, aërated waters, or a little milk, warm in winter. A tumbler of water, aërated water, or, in winter, hot water, at bedtime."

Exercise in the open air facilitates interstitial oxidation, and improves excretion. Mountain-climbing benefits many. Cold sponge baths, with brisk friction from a rough towel thereafter, are desirable, unless reaction be feeble. In the latter case warm baths are indicated. The bath should be taken in the morning and the patient should return to bed for an hour at least. For certain patients dry, hot-air baths, Turkish or Russian baths are desirable; to others, sea baths are beneficial.

Medicinal treatment consists in the intelligent and discriminate use of alkalies, salicylates, and benzoates, mineral acids, purgatives, mineral

waters, colchicum, lithium salts, piperazine, mercurials, iodides, quinine, antipyrin, guaiac, and certain other drugs. There is no routine treatment for the disease; the patient must be studied and treated according to the nature of the case. Consult Haig, *Uric Acid in the Causation of Disease* (London, 1894).

GOUVERNEUR, gōō'vēr-nēr. A village in Saint Lawrence County, N. Y., 35 miles south of Ogdensburg, on the Oswegatchie River and on the New York Central and Hudson River Railroad (Map: New York, E 1). It has extensive marble and wood-pulp interests, iron-mines, talc mines and mills, and other manufactures. There is a public library, and the water-works are owned by the municipality. Population, in 1890, 3458; in 1900, 3689.

GOUVION, gōō'vī'ŏn, Laurent, Marquis de Saint-Cyr. See Saint-Cyr.

GOUVY, gōō'vē, Théodore Louis (1822-98). A German pianist and composer, born at Goffontaine, near Saarbrücken, in Rhenish Prussia. At the age of twenty-one he was a student of law in Paris, but abandoned that profession for music. After a thorough course of study in Berlin and Rome, including three years under the celebrated Elwart, he returned in 1846 to Paris, and gave his first concert under very successful auspices one year later. The programme consisted of his own compositions. He was throughout his life a popular teacher in both France and Germany. In the former country he was made a chevalier of the Legion of Honor in 1886. His works include: *Missa Brevis* for solo, chorus, and orchestra; *Frühlings Erwachen*, for soprano solo, male chorus, and orchestra; a *Requiem High Mass; Golgotha*, a sacred cantata; several dramatic cantatas, and numerous smaller vocal and instrumental pieces. His compositions, which had a considerable vogue, contain many elements of permanency, and are characterized throughout by a melodious blending of solid German and graceful French harmonic construction. He died at Leipzig.

GOVAN, gŭv'an. A burgh in the shires of Lanark and Renfrew, Scotland, on the left bank of the Clyde. Its prosperity depends upon Glasgow, which has embraced it within its natural boundaries (Map: Scotland, D 4). It contains large ship-building yards, engineering works, foundries, and other industrial establishments. Population, in 1891, 63,625; in 1901, 76,351. In the sixteenth century this ancient village was one of the largest in Scotland, and down to the middle of the seventeenth century bore the name of 'Meikle Govane.'

GOVERNMENT (OF. *government, gouvernement*, Fr. *gouvernement*, from Lat. *gubernare*, to govern, steer, from Gk. *κυβερνᾶν, kybernan*, to steer). In the most general sense, any orderly arrangement and management of affairs, especially in human society. It is in this sense that we employ the term, in such widely related expressions as the divine government, household government, and the like. Specifically the term is most commonly used as a condensed expression for political government, or the authoritative regulation of the affairs of a political community or State. Though often confused with the State itself, government is more properly conceived of as the external political organization of the State, as the mode in which, and the agencies by which, the State puts forth its energies. A State may thus completely change its political organization without losing its political identity, as the French nation has in little more than a century passed through all the phases of government from absolute monarchy to republican democracy, without a change in its essential character and unity as a State. Indeed, we may conceive of a State as existing without any government, the authority of the latter in the preservation of order and the enforcement of obligations being supplied by mutual coöperation and goodwill on the part of the citizens. It is at the realization of such a State, and not at the dissolution of all civic and social relations, that the philosophic anarchy of the present day is aimed. The imaginary 'state of nature,' pictured by Rousseau and other writers of the eighteenth century, involves, on the other hand, the complete negation of the State, i.e. of all civic relations, as well as of government. It does not seem likely that humanity will ever be able to dispense with either. With the growing complexity of human affairs, the necessity for the organization of society in political communities grows ever greater, and there are no indications of the disappearance of those predatory instincts of human nature upon which the necessity for organized government is based.

Nature of Government. Government means authority, and in the last analysis all government rests upon force, i.e. upon the power of constraining the action of any citizen or any number of citizens through the organized agencies of the State. This power may not be wisely or uniformly exercised; it may even, in the case of the modern industrial State, seldom or never be openly exerted; but no government can exist without it, and a government is partial and incomplete, or perfect and complete, in proportion as it is able to command this power. The mere fact that the governing authorities of a State tolerate certain forms of injustice, or refuse or neglect to enforce certain laws, does not detract from the completeness of the government, so long as it has in reserve the power to compel obedience to its decrees. But a government may be one of limited powers, not because of any inherent lack of force, but because its authority is restricted by its constitution to a limited class of matters. Such limitation may be voluntary, as is the case in the United States and the self-governing colonies of Great Britain, where governmental power is distributed between the several States and the central government, or it may be imposed upon a State by the action of a paramount State, as is the case with Cuba under the recent convention with the United States. In much the same sense, we may speak of the government of minor political divisions of a State, as of cities, towns, and counties, as a government of limited powers. Within the sphere of their chartered authority, these may have ample governmental powers, but the scope of that authority and the field of its exercise are strictly limited by the grant or charter conferring it.

The two most striking facts in connection with political government are, first, its universality, and, second, the variety of forms in which it has manifested itself. It has existed in all stages of human society, and, in at least a rudimentary form, in every considerable group of men and women united for a common purpose. This uni-

versality of its occurrence testifies to its necessity, and probably to its permanence as an institution of human society. Of all human institutions, it has proved to be the most enduring, and, with the exception of the family, probably the most important and influential in shaping the destiny of mankind. Men have found it possible —as in China to-day—to live without an organization of religion, and, as in Sparta and among many barbarous tribes, without the institution of the family as we understand it; but wherever men and women live in society, some form of government arises to regulate their relations to one another and to other communities.

But, although government is the oldest, the most persistent, and the most widespread of human institutions, there is no normal or absolute type of political organization. We may trace its origin to the institution of the patriarchal family, but the patriarchal type of government is limited to society in its primitive stages, and in small aggregations. Men have sought for an ideal or absolute type in their conception of the divine government, and for centuries the glamor of the later Roman Empire cast its spell over Europe, and successive generations of statesmen and political philosophers endeavored to recast the governments of Europe into a Holy Roman Empire; the seventeenth century brought to its culmination the mediæval theory of the divine right of kings, and the eighteenth resolved all political authority into a social compact (*contrat social*) among the members of the State. But no one type of government has emerged, either in fact or in theory, out of all this speculation. Governments are as diverse as ever, and we have come to recognize this diversity as a proof of their excellence and not as a defect. It is a part of the accepted philosophy of our time that a government should in its spirit and its form express the political consciousness and aims of the community, and that that government is best which most accurately reflects the character, the interests, and the purposes of the State. See SOCIETY; SOCIOLOGY; STATE.

FORMS OF GOVERNMENT. In respect of its nature a government may be either autocratic, as wherever the essential power of the State is, under whatever form, directed by an individual or by a select class of persons constituting a minority of the State; or it may be popular, as where the substantial power is vested in the entire body of persons constituting the State. The old classification of governments into monarchies or tyrannies, aristocracies or oligarchies, and democracies, which we owe to Aristotle, is defective in that it confuses the external form with the essential character of the government. It presupposes a simplicity of organization, and a correspondence between the form of the government and the actual seat of power, which are not always realized outside of the ideal commonwealth. There is, it is true, a form of political organization which is peculiarly appropriate to every kind of government. Under such an ideal arrangement, a tyrant would always be a king or emperor; an oligarchy would dispense with the trappings of royalty, and with the fiction of republican forms; and popular government would always appear in the proper guise of a republic. But in practice the matter is by no means so simple. Old forms of government remain long after the balance of power and the actual seat of authority have been shifted and transferred, or a popular form may be deliberately adopted to veil an unpopular exercise of authority. The republican form of government survived in Rome for centuries after the assumption of power by the emperors had become complete. The government of Mexico, like that of most of the Spanish-American republics, is a scarcely disguised autocracy. The same was true of the consulate of the first Napoleon, while the government which bears the name of King Edward VII. of England is perhaps the best existing example of a government of the popular or democratic type.

The monarchical form of government is still the prevalent form, covering as it does substantially the whole of Europe, Asia, and Africa, and half of North America. These royal governments may be divided into two groups, those in which the royal power has been wholly or partially transferred to the body of the people, known as limited monarchies; and those in which the autocratic principle remains substantially unimpaired. The more usual type of autocracy is an oligarchy, more or less thinly disguised under the forms of monarchy. In such States it is not an individual, but a caste, a ruling class, which actually directs the energies of the State. This caste may be hereditary, as in Japan, in which case we call it an aristocracy; or it may be tribal, or racial, like the Manchu oligarchy which sways the destinies of the vast Chinese Empire, and the castes which formerly dominated the native States of India; or it may be merely bureaucratic, a compact guild of officeholders, such as that which, under the influence of Russian traditions, directs the policy of the Czar. This continued prevalence of the monarchical form of government is one of the surprises of recent political history. To the observers of half a century ago it seemed as though the democratic movement which swept over Europe at that time was destined to destroy all the ancient thrones, and set up self-governing republics in their stead. But such observers forgot that royalty might continue, though shorn of much of its power, and that the people might rule through the forms of monarchy. Accordingly every government in Europe, with the exception of Russia and Turkey, has become largely popular in substance, if not in form, and, of these two, Turkey is the only remaining example of a pure monarchy of the feudal type. See ARISTOCRACY; CONSTITUTION; DEMOCRACY; MONARCHY; OLIGARCHY.

COMPLEX VARIETIES OF GOVERNMENT. Thus far the government of States has been dealt with as though each were a unit, animated by a single political principle. But the matter of civil government is far too complex to be covered by a single formula. Each State is the theatre of different, and often conflicting, political experiments. There is always a central government, sometimes strong, and sometimes so weak that it can scarcely hold together; and in either case there is usually a considerable organization of local governments—of towns, parishes, boroughs, communes, and the like—largely independent of the central government, and often organized on diametrically different principles. We are not surprised to find a considerable development of local self-government in the towns and parishes of England and the United States; but that a democratic system of local self-government should

exist throughout the Russian autocracy, and that the communal governments of the French Republic should be strictly supervised and controlled from Paris, would hardly be expected from the nature of the central government in either case. The inconsistency is explained by the fact that the local governments, which touch the average citizen most nearly and by which all of the ordinary affairs of life are regulated, are seldom created by the central government, but in most instances had been fully developed before the latter came into being, and not only is the hamlet or village government usually much older than the general government of the State, much older, indeed, than the State itself, but it is also much more enduring, much more tenacious of life, and, upon the whole, much more important to the State than the central government. The latter may be a usurpation, or the accidental result of a war; it may change with the death of a ruler or the end of a dynasty, without affecting the internal structure of the State or the organization of society. But the local government is the slow growth of time, interwoven with the habits and compounded of the customs of the community; it is never foreign, never alien; while it lasts the State endures, and when it is dissolved the social foundations of the State are disintegrated.

Other elements of complexity result from the union of different States in one political organization, or under one sovereign, or from the administration by one State of a variety of colonies or dependencies. The first of these is the federation, or federal State, of which the United States of America, the Dominion of Canada, the Australian Commonwealth, and the German Empire are the leading examples. Akin to this is the union of England, Scotland, and Ireland in the Kingdom of Great Britain. The union of two or more States under a common ruler, but without becoming one nation, is illustrated by the ephemeral political leagues of ancient Greece, by the German Confederation of 1867, and by the modern kingdoms of Austria-Hungary and Scandinavia. The British Empire affords the most striking illustration of the union of a great variety of governmental forms under one central authority. The government of Great Britain is a score of different governments rolled into one. In England and the self-governing colonies, it is a democratic kingdom; in Ireland, a parliamentary autocracy limited by constitutional forms; in India, an empire wholly autocratic; in Egypt, a satrapy; and everywhere, in the villages of India, in the commonwealths of Canada and Australia, and in the counties of England, it shelters a variety of local governments which perform their ancient functions under the central authority of the Empire. See FEDERAL GOVERNMENT; GREAT BRITAIN; UNITED STATES.

MODERN INNOVATIONS IN GOVERNMENT. The rise of democracy and the spread of popular government have been referred to above, and are elsewhere described. (See DEMOCRACY.) But one result of this movement remains to be considered —the discovery and wide application of the principle of representation in government. It was the lack of this principle that hampered the development of the republics of antiquity and which forced them to assume the imperialistic form. Expansion under those conditions could mean only imperialism—the extension of the rule of the republic over populations which could not, in the nature of the case, participate in the government. It is to England that we owe the discovery of this principle, and to the United States that we owe the demonstration of its capacity to serve the needs of a great and expanding nation, stretching over a vast continent. But it has not only performed the inestimable service of creating great States on the republican model; it has also furnished means for introducing a measure of popular government into the ancient monarchies of Europe, and thus of satisfying the political aspirations of the democracy of the Old World. Since its introduction in England it has become the accepted model of a popular government wherever such government has been introduced. See CABINET; CONSTITUTION; PARLIAMENT; REPRESENTATION.

OBJECTS OF GOVERNMENT. Broadly speaking, the objects of political government are well expressed in the preamble to the Constitution of the United States, to "establish justice, insure domestic tranquillity, provide for the common defense, promote the general welfare, and secure the blessings of liberty to ourselves and our posterity." That these are the principal objects for which governments exist, and that they are all within the sphere of proper governmental action, are propositions which no one denies. It is in the definition of these general objects that differences of opinion appear. A recent writer of authority has divided the functions of government into two groups: the *constituent functions*, or such as are fundamental and necessary in every organized political society, and the *ministrant functions*, which are undertaken, not of strict necessity, but in order to minister to the general welfare. The former include the defense of the State against foreign aggression, the preservation of the peace, the administration of justice, the definition and punishment of crime, the regulation of the domestic relations and of property rights, and the determination of the political rights and duties of citizens, and the status of aliens—all of them purely public functions which could not be left to be determined by chance or committed to the citizens individually. The ministrant functions, on the other hand, are such as might conceivably be left unperformed or left to private initiative, as the coinage of money, the regulation of trade, the maintenance of highways and of postal and telegraph systems, sanitary regulation, public education, the care of the poor and incapable, and the like. It is in determining the extent to which government should go into this broad field of service to society that political philosophers and statesmen are at odds. The *laissez-faire* school, represented by John Stuart Mill and Herbert Spencer, would confine the functions of government as closely as possible to those of the constituent class; while, at the other extreme, there are many thinkers of advanced socialistic views who favor a great extension of ministrant activity on the part of the government. Though the last quarter century has witnessed a decided reaction from the principles of the *laissez-faire* philosophy, it has as yet produced no considerable effects in England or in the United States. On the Continent of Europe, however, and still more in the British colony of New Zealand, the field of governmental action has of late been greatly widened. That these enlarged views of

the functions of government have not made greater progress in the two most democratic States in existence—England and the United States—appears to be due to the large part which the conceptions of individual liberty and private rights play in their political thinking, and to their consequent jealousy of any extension of State action. See POLITICAL SCIENCE; SOCIALISM.

For the methods of governmental action, see ADMINISTRATIVE LAW; CIVIL ADMINISTRATION; CIVIL SERVICE; COURT; LAW.

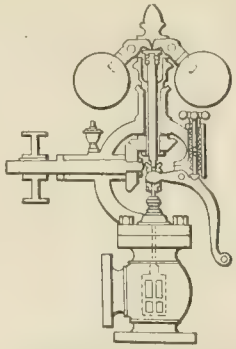
BIBLIOGRAPHY. The authorities are numerous. Only the most important can here be given. Aristotle, *The Politics* (Jowett's translation); Plato, *Republic*, and *Dialogues* (Jowett's translation); Cicero, *On the Commonwealth*, and *On the Laws;* Machiavelli, *The Prince* (Morley's translation), and *Discourses on the First Decade of Livy* (Thomson's trans.); Locke, *Civil Government;* Hobbes, *Leviathan;* Rousseau, *The Social Contract;* Montesquieu, *The Spirit of Laws;* De Tocqueville, *Democracy in America;* Guizot, *Representative Government;* John Stuart Mill, *Liberty*, and *Representative Government; The Federalist;* Woolsey, *Political Science;* Burgess, *Political Science;* Bagehot, *The English Constitution;* Amos, *Law and Custom of the Constitution;* Dicey, *The Law of the Constitution;* Bryce, *The American Commonwealth;* Wilson, *The State;* Mulford, *The Nation;* Jenks, *Law and Politics in the Middle Ages* (New York, 1898); Dunning, *A History of Political Theories* (New York, 1902); Giercke, *Political Theories of the Middle Ages* (Maitland's trans.); Wood, *Government and the State* (New York, 1902); Bluntschli, *Staatslehre.* Consult the authorities referred to under CONSTITUTIONAL LAW; INTERNATIONAL LAW; JURISPRUDENCE; POLITICAL SCIENCE; and the various titles which are referred to above.

GOVERNMENT LAND. All land within the United States the title to which is not in a State or an individual. This includes all land occupied for governmental purposes, as for military or naval posts and stations, public buildings, etc., but the term is popularly used as being synonymous with 'public lands.' In this sense, only such land, owned by the Government, as is unsurveyed and open to sale or occupation under the 'Homestead Laws,' is included. Land may be acquired by the Government for public use under the power of eminent domain, and property thus acquired would be 'Government land' in the broadest sense, but not as the term is commonly used, as such lands would not be open to public occupation and preëmption. See EMINENT DOMAIN; HOMESTEAD LAWS; LANDS, PUBLIC.

GOVERNMENT'S ISLAND. See ROCK ISLAND.

GOVERNOR (OF. *governeor*, Fr. *gouverneur*, It. *governatore*, from Lat. *gubernator*, governor, pilot, from *gubernare*, to pilot, from Gk. κυβερνᾶν, *kybernan*, to steer). The chief executive officer in the States of the American Union. He is elected by the people of the State, and his rights and duties are, in general, those usually associated with the head of the executive department in a republican form of government, namely, the appointment of certain classes of officials, the exercise of the pardoning power and the right of veto and the command of the State militia. The term of office and the specific limitations on the Governor's powers vary, naturally, from State to State, and will be found under the heading *Government*, in the articles on the different States.

GOVERNOR. A device for controlling the running speed of a steam-engine, gas-engine, water-wheel, or other motor. They are made in a variety of forms and with various methods of action. In all, the action is in substance to increase or decrease the supply of the motive power as the speed or the load decreases or increases, and thus to preserve a constant speed. The steam-engine governor, one form of which is shown in the illustration (see STEAM-ENGINE), is an excellent example. The balls, which are mounted on a spindle revolved by gearing or belting connected with the main shaft, tend to fly out from the centre by centrifugal force as the speed of the engine is increased. In so doing they act on the valves and allow the proper amount of steam to pass from the boiler to the cylinder. See GAS-ENGINES; WATER-WHEEL.



STEAM-ENGINE GOVERNOR.

GOVERNOR'S ISLAND. An island in Boston Harbor, Massachusetts, occupied entirely by the National Government for purposes of defense. The principal fortification is Fort Winthrop.

GOVERNOR'S ISLAND. A small island in the Bay of New York, near the lower point of Manhattan Island, at the entrance of the East River (Map: Greater New York, D 9). Its area is 65 acres. It is occupied entirely by the Federal Government for military and naval purposes. The forts are Columbus, Castle William, and South Battery. There are some fine buildings for the principal officers, and the island is usually the headquarters of the military division of the Atlantic. The ordnance department has a depot here. See FORT COLUMBUS.

GOVI, gō'vē, GILBERTO (1826-89). An Italian scientist, born at Mantua. He successively occupied the chair of physics at Florence, Turin, and Naples. He was a voluminous writer and enjoyed considerable repute as a scientist, in which capacity he represented Italy at the International Commission on the Metrical System, held at Paris. His principal literary productions include: *Metodo per determinare la lunghezza del pendolo* (1866); *Galileo Galilei* (1864); *Romagnosi e l'elettro-magnetismo* (1869); *Il Sant' Uffizio, Copernico e Galileo* (1872); *Leonardo letterato e scienziato. Studio sul genio e sulle scoperte di Leonardo da Vinci* (1872); and *Teoria dell' elettroforo* (1882).

GOVIND. The familiar scavenging kite of East Indian towns. See KITE.

GOW, gou, NEIL (1727-1807). A Scotch violin-player, born at Inver, near Dunkeld. He had played the violin from boyhood, but received some instruction from John Cameron, a retainer of the Stuarts. He was patronized by many of the Scotch nobility, especially the Duke of Athol, and

had a wide reputation for his skill with the bow. His compositions were mostly reels and dances. His four sons were also violinists. NATHANIEL GOW (1766-1831), the youngest, was the pupil of his father. He became one of the King's trumpeters, a well-known teacher, and published a number of collections of Scotch music, in which several of the selections were by his father and brothers. He himself wrote the popular "Caller Herrin'" and many other compositions.

GOWAN, *gou'an*, OGLE ROBERT (1796-1876). A Canadian legislator. He was born in County Wexford, Ireland, and removed in 1829 to Canada, where he became distinguished as a commander of British troops during the Rebellion of 1837-38, rising to the rank of lieutenant-colonel. The name of 'The Queen's Royal Borderers' was conferred upon the regiment which he had commanded. In 1831 he was elected a member of the Parliament of Canada, and served in that body till 1841. He was grand master of the 'Orange Lodges of North America.' He wrote two books on the subject, and also was conspicuous in Masonry.

GOW'ER, JOHN (c.1325-1408). An English poet. He was probably connected with the family of Sir Robert Gower (died about 1349), a large landholder in Suffolk and in Kent. He married (probably for the second time) in 1397. He was then residing in the priory of Saint Mary Overies, Southwark. In some way he made money, with which he bought land. It is inferred from his writings that he was a merchant, very likely an exporter of wool. Chaucer dedicated to him *Troilus and Cressida*, and before going abroad in 1378, nominated him one of his attorneys. Gower, in turn, paid Chaucer a compliment near the close of the *Confessio Amantis* (first version). In 1400 Gower became blind. He died in 1408 (between August 15th and October 24th), and was buried in Saint Saviour's Church, Southwark.

Gower sought to rest his fame on three great poems, written in three languages, French, Latin, and English. To each poem he gave a Latin title. The first, "Speculum Meditantis" (assigned to 1376-79), long supposed to be lost, was identified by G. C. Macaulay, in 1895, with a manuscript in the Cambridge University library, bearing the title "Mirour de l'Omme." The poem aims to give a complete account of the moral nature of man and to explain God's dealings with him and the world. The second poem, "Vox Clamantis" (1382-84?), written in Latin elegiac verse, describes the insurrection led by Wat Tyler. Of the third poem, "Confessio Amantis," there are two versions, one dedicated to King Richard II. and the other to Henry of Lancaster. They are assigned respectively to 1383 and 1393. The poem, which contains about 30,000 octosyllabic lines, is divided into a prologue and eight books. After the long prologue descriptive of the degradation of the time, a lover appeals to Venus to cure his malady. Venus sends a confessor called Genius to shrive him. Then ensues a long dialogue, in which the confessor relates current moral stories for the purpose of warning the lover against the various vices. Besides these longer works, Gower wrote minor poems in French, Latin, and English. Among them are the *Traitié* (1397?) and the *Cinkante Balades* (1399?), both in French verse. The former sets forth the nature of the marriage state; the latter, a collection of fifty-one ballades, contains more poetic feeling than Gower's other poems. Chaucer called his contemporary 'moral Gower.' The epithet exactly describes the intent of all his work. Possessing no originality, Gower took tales from many sources and moralized them. Popular in his own time, and long regarded as the equal of Chaucer, he has become for the modern reader tedious and monotonous. With some exaggeration, Lowell called him "the undertaker of the fair mediæval legend." His work, however, has very great philological interest. His *Complete Works* were edited by G. C. Macaulay (Oxford and New York, 1902).

GOWER, Lord RONALD SUTHERLAND (1845—). An English sculptor and author. He was born in 1845 at Stafford House, the youngest son of the second Duke of Sutherland, and was educated at Eton and at Trinity College, Cambridge. Among his works of art are "Marie Antoinette on Her Way to Execution," "The Old Guard at Waterloo," the "Shakespeare Monument" at Stratford, and "Christ," presented to the city of New York in 1889. Among his publications are the interesting *Reminiscences* (1883); *Life of Joan of Arc* (1893); *Last Days of Marie Antoinette* (1885); and *The Tower of London* (1901).

GOW'RIE CONSPIRACY. One of the most mysterious events in the history of Scotland. It took place in August, 1600. John Ruthven, third Earl of Gowrie, was then residing on his estate at Perth, and with him lived his brother, Alexander Ruthven. There was ill feeling at the time between the Earl and James VI., afterwards James I. of England, who had put the Earl's father to death for treason, and who owed Gowrie a large sum of money. On the 5th of the month, the King, with a few attendants, visited Gowrie Castle in order, as Alexander told a servant, to confer with the Earl in regard to the debt. After dinner Alexander led the King to a private study on 'a quiet errand,' and Gowrie took the other guests into the garden to eat cherries. While the guests were thus engaged, a servant came and told them that the King had quit the castle and had ridden off to the Inch. Gowrie left the company for a moment, and on his return confirmed the servant's report. While the guests were in great excitement, not knowing what to do, they heard the King shouting "Treason!" from the study window, and looking up, caught a glimpse of his face. Naturally suspecting Gowrie, they tried to seize him; but as he escaped, four of them made their way to the study, where they are said to have found Alexander Ruthven struggling with the King. They killed Ruthven with their daggers, after which Gowrie, accompanied by his servant, Cranston, burst into the room with a sword in each hand. Though he fought desperately to avenge his brother, he was overpowered and killed. In the room with Ruthven the King had found a man in armor, who, it was afterwards alleged, was Henderson, Gowrie's chamberlain. This man testified in court that Gowrie had ordered him to go to the chamber, put on his armor, and do Ruthven's bidding. As it appeared that Henderson had not raised his hand against the King, he was pardoned. The court used torture to extort evidence from Gowrie's servants, and accepted nothing in favor of their master. Three

servants were hanged, the estates of the Ruthvens were confiscated, their name and honors were abolished, and the house in which the strange event took place was destroyed. In explanation of the mystery it has been suggested that the Ruthvens were the tools of Queen Elizabeth, who may have wished to secure possession of the King's person in order to control Scotland in his name, but in her own interest. Possibly, however, there was no plot—a quarrel over the debt may have led to violence, after which the King, with the help of the Court, may have contrived the story to hide his own fault. Consult: *Register of the Privy Council of Scotland*, vi.; *Acta Parl. Scot.*, iv.; Mackenzie, *An Historical Account of the Conspiracies by the Earls of Gowry and Robert Logan of Restalrig Against King James VI.* (Edinburgh, 1713); White, *The Earl of Gowry: A Tragedy* (London, 1845); Barbé, *Tragedy of Gowrie House* (Paisley, 1887); Winwood, *Memorials of Affairs of State in the Reigns of Queen Elizabeth and King James* (London, 1725); Pitcairn, *Ancient Criminal Trials in Scotland* (Edinburgh, 1833); Calderwood, *History of the Kirk of Scotland* (Edinburgh, 1842-49); Spottiswoode, *History of the Church of Scotland* (Edinburgh, 1851); Laing, *History of Scotland*, i. (London, 1819).

GOYANA, gō-yä'nâ. A city of Brazil, in the State of Pernambuco, situated on the Goyana River, 18 miles from its mouth (Map: Brazil, L 5). It has an active trade in sugar, cotton, and dyewood. During the war with the Dutch in the seventeenth century, Goyana was an important centre. Population, 15,000.

GOYA Y LUCIENTES, gō'yà ē lōō'thē-ān'tâs, FRANCISCO (1746-1828). The leading painter of the Spanish School in the eighteenth century. He was born March 30 or 31, 1746, near Saragossa. According to one tradition, his family were peasants in extreme poverty; according to another, his father was a gilder, who was able to do something for the welfare of his son. At the age of twelve we find Francisco at Saragossa in the academy which José Lusan y Martinez, a painter of ability, who had studied in the Neapolitan School, had established. According to tradition, Goya was obliged to leave Saragossa on account of some escapade, and went to Madrid, where he was powerfully affected by the works of Velazquez (q.v.). After some years in Madrid he went to Rome. He studied the Italian masters rather by contemplation than by actual copying, and in Rome, as everywhere, was most interested in the picturesque life of the people. In 1775 Goya returned to Madrid. He was employed by Raphael Mengs, then Superintendent of Fine Arts in Madrid, to design cartoons for the royal manufactory of tapestries at Santa Barbara intermittently until 1791. Some of these cartoons are in the Museum of the Prado. About 1780-81 he decorated a chapel of the Church of Santa Maria del Pilar at Saragossa, and between 1787 and 1798 he painted the decoration of the palace of Alameda near Madrid. Goya's most monumental work is the decoration of the Church of San Antonio de la Florida, near Manzanares, finished in 1798, a series of religious pictures from the life of Saint Anthony, in the manner of Tiepolo. This is the period of his greatest success. In 1788 he was made member by merit of the Academy of San Fernando in Madrid, and in the same year painter of the Chamber to the new King, Charles IV. Ten years later he was made chief painter of the Chamber. He was created Lieutenant Director of the Academy of San Fernando in the place of Andreas Calleja in 1793.

The insurrection of March 19, 1808, which ended the reign of Charles IV., interrupted the career of Goya. He endeavored to associate himself with the Bonapartes, even serving on the commission to select fifty of the best Spanish pictures for the Louvre. After a time, however, the French occupation exasperated him. After the return of the Bourbon King Ferdinand VII. in 1813, Goya was reinstated as painter of the Chamber. His political views forced him to leave Spain, and in 1822 he visited Paris for the first time. With the exception of a short visit to Madrid in 1827, when his portrait was painted by his successor, Vicente Lopez, he passed the rest of his life at Bordeaux, where he died April 16, 1828.

The chief interest of Goya was with the lower classes. He loved a vagabond life, and even at the summit of his success was most often to be found in the resorts of the common people. From them were taken the motives and subjects for the immense mass of drawings, etchings, water-colors, genre pictures, and portraits which he left. His palette was very simple. He painted directly, without glazes. His brilliant style was unique, but his technical qualities were founded upon a profound study of the great technicians of the seventeenth and eighteenth centuries. Goya was quite celebrated as a portrait painter, but his portraits were only good when the subject pleased him. Among his best portraits are: one of himself, in the Academy of San Fernando; a group of Charles IV. and his family, in the Prado; equestrian portraits of Charles IV. and his Queen, Maria Louisa, in the Prado. He appears at his best in the marvelous double portrait of "La Maya," in the Academy of San Fernando, representing a beautiful young girl, lightly draped. As an etcher, he is of almost equal importance. His series "Los caprichos" (Caprices) is a bitter satire upon government, religion, and society; "Los desastres de la guerra" (Disasters of War), the testament of a Liberal, and the "Tauromaquia" (Bull-Fight) are among the best of his series of etchings. All reveal a great master, both in technique and conception, and the deep study of Rembrandt.

For his bibliography, consult: Yriarte (Paris, 1867); Lefort (ib., 1877); Zapater y Gomez (Saragossa, 1868); Hamerton, in *Portfolio* (London, 1879); Viñaza (Madrid, 1887); and Lafond, in *Revue de l'Art*, vol. v. (Paris, 1899).

GOYAZ, gō-yäz' (from the extinct Indian tribe of *Guayazes*). A State of Brazil, bounded by the State of Maranhão on the north; by Maranhão, Piauhy, Bahia, and Minas Geraes on the east; by Minas Geraes on the south; and by Pará and Matto Grosso on the west (Map: Brazil, H 6). Area, 288,470 square miles. Goyaz forms a part of the Brazilian table-land, and is traversed by a number of mountain ranges in the south and along the eastern boundary. Forests are found only along the rivers, but a large part of the State is covered with a low brushwood. The chief rivers are the Tocantins, which runs through the central part of the State in a northern direction, and the Araguayá, which forms the western boundary. Little is known of the northern part of Goyaz. The climate is

moderate and generally healthful. In spite of its abundant natural resources and favorable climate, Goyaz is one of the most isolated and least developed of the Brazilian States. One of the chief reasons for this is to be found in the lack of transportation facilities. There are no railways, while the large rivers are rendered unfit for navigation by their numerous rapids. Agriculture is little developed, the production being barely sufficient to supply the domestic demand. The gold deposits of the State, once extensive, are apparently exhausted, the mining industry being extinct. The chief centres of population are found in the south. Population, in 1890, 227,572. The Indians number about 25,000, and there are large numbers of negroes. Capital, Goyaz (q.v.). In the southern portion of the State a territory of about 5500 square miles has been set aside for the future capital of the Republic of Brazil.

GOYAZ (formerly Villa Boa de Goyaz). A city of Brazil, and the capital of the State of Goyaz, situated on the river Vermelho, 600 miles northwest of Rio de Janeiro (Map: Brazil, H 7). The town is handsomely built, and has a fine cathedral, Government palace, a town hall, and a theological seminary. Gold is found in the river Vermelho, and both gold and diamonds in the neighboring district. The city was founded in the latter part of the seventeenth century by the son of Bueno de Silva, one of the early explorers of the region. Population, 8000.

GOYEN, goi'en, JAN VAN (1596-1656). A Dutch painter, born in Leyden. He studied under Van Schilperoot, who probably took him to France, and then under Esaias van de Velde at Haarlem (1616). In 1631 he returned to The Hague, and he became president of the guild there in 1640. His pictures vary little in subject; they are usually of a harbor, or canal, with boats, and he painted a great many of them. They are found in nearly all the galleries of Europe. His best style is well represented by a "View of Dordrecht" (1650), in the Museum of Amsterdam, and "Banks of a Canal" (1653), in the Louvre—both marked by masterly perspective and true Dutch feeling for fine skies. He also left a number of drawings and water-colors. Among his well-known pupils were Jan Steen (his son-in-law), Berghem, and Solomon Ruysdael. His choice of subjects influenced considerably the great landscape painters who followed him, so that he occupies a unique place in Dutch art.

GO'ZAN. (1) A province in Mesopotamia, called Guzan in the Assyrian inscriptions and Gauzanitis by Ptolemy, situated on both sides of the river Chabur (Khabur), a tributary of the Euphrates, and comprising roughly the northern half of the later Kingdom of Osrhoene. It seems to have been added to the Assyrian Empire in the ninth century B.C. In B.C. 809 it revolted and again in B.C. 759, but was finally subdued in B.C. 758. This province was ruled by a prefect who occasionally appears as *limmu*, after whom the year was named. In this district a colony of Israelitish exiles was settled by Sargon after the capture of Samaria in B.C. 722 (II. Kings xvii. 6; xviii. 11). (2) A city situated between Nisibis and Tushchan in Mesopotamia, probably the capital of the Province of Gozan. Consult: Delitzsch, *Wo lag das Paradies?* (Leipzig, 1881); Schrader, *Keilinschriften und Geschichtsforschung* (Giessen, 1878); Winckler, *Alttestamentliche Untersuchungen* (Leipzig, 1892).

GOZLAN, gôz'läN', LÉON (1803-66). A French novelist and playwright, born at Marseilles. After trying his hand at various professions, he became a journalist, and for thirty years contributed to all the best papers in Paris. His productions include: *Le notaire de Chantilly* (1836); *Aristide Froissart* (1843); *Les émotions de Polydore Marasquin* (1857); *La nuit blanche* (1844); some souvenirs of Balzac, *Les jardins, Balzac en pantoufles* (1856). He also wrote a number of plays, of which only two need be mentioned—*La pluie et le beau temps*, and *Une tempête dans un verre d'eau.*

GOZO, or **GOZZO,** göt'sô (Lat. *Gaulos*). An island belonging to Great Britain in the Mediterranean, situated about four miles northwest of Malta, with which it was probably at one time connected (Map: Italy, J 11). Its area is over 20 square miles; its surface is diversified, and consists largely of coralline limestone. It has a rich and well-cultivated soil. There are some Phœnician remains in the shape of Cyclopean walls, and some Roman monuments. The chief town is Rabato, and the population is over 19,000.

GOZZI, göt'sê, CARLO, Count (1720-1806). An Italian dramatist, born at Venice, the brother of Gasparo Gozzi (q.v.). He began in his youth to write, and his pieces, slight but satirical, were directed against Chiari, and Goldoni, who had introduced so much that was new on the Italian stage. Gozzi defended the Commedia dell' Arte with its accepted types, and published *Tartana degli influssi per l'anno bisestile* (1757), a popular satire. In 1761 he wrote what he called a 'dramatic fairy tale,' *Fiaba dell' amore delle tre melarancie.* This was followed by others on the same order, among which are *Turandot*, translated by Schiller, and *L'angellino Bel Verde*, all taken from old Italian fairy lore. For a while these held a prominent place on the Venetian stage; then Gozzi began to translate French plays, and wrote some dramas modeled after Calderon. His fairy plays are little known outside Italy, as they are written in the Venetian dialect; but they deserve a wider reputation. One of his last and most interesting works is *Memorie inutili* (1797), translated by Symonds (1889). He edited part of his own works (1772-74), but a complete edition was published in 1802. Consult: Magrini, *I tempi, la vita e gli scritti di Carlo Gozzi* (Benevento, 1883); id., *Carlo Gozzi e le fiabe* (Venice, 1883); and Masi, *Sulla storia del teatro italiano nel secolo XVIII* (Florence, 1892).

GOZZI, GASPARO, Count (1713-86). An Italian author, born at Venice, and the brother of Carlo Gozzi, the dramatist. He was the director of the Sant' Angelo Theatre in Venice, and began to translate plays from the French for representation there, but was not very successful. He then took the management of the *Gazzetta Veneta*, and later edited the *Osservatore periodico* (1761). These established his reputation as a critic and stylist. Gozzi is also well known through his defense of Dante against Bettinelli in *Giudizio degli antichi poeti sopra la moderna*

censura di Dante, etc. (1755). The complete editions of his works are *Il mondo morale* (1760), and *Lettere famigliari* (1755). The complete editions of his works (Venice, 12 vols., 1794; Bergamo, 20 vols., 1825-29) include some poems.

GOZZO, göt'sô. See Gozo.

GOZZOLI, göt'sô-lê, Benozzo (1420-98). A Florentine painter of the early Renaissance. His real name was Benozzo di Lese, and he was born near Florence. He began his career as a goldsmith, and assisted Ghiberti on the bronze gates of the Baptistery at Florence. A pupil of Fra Angelico, he assisted him in the painting of the vault in the Chapel of the Madonna di San Brizio, in the cathedral at Orvieto, in 1447; the following two years he was at Rome, and from 1450 to 1452 at Montefalco. Perhaps the greatest monument to his style is in the frescoes, executed in 1459, in the private chapel of the Riccardi Palace, Florence. The subject of the paintings is the "Story of the Magi," which is interpreted with a true love for the pageant of the fifteenth century. It is executed with the charm of a miniature on a large scale, and a decorative quality rarely equaled in the same century. From 1464 to 1467 he painted an important series from the life of Saint Augustine, in the Church of San Agostino at San Gimignano. The series of twenty-two frescoes on the wall of the Campo Santo, Pisa, is a testimony to his versatility in the interpretation of scenes from the history of the Old Testament, beginning with the "Life of Noah," and ending with the "Visit of the Queen of Sheba to Solomon." The Pisans showed their appreciation of this great work by presenting him with a sarcophagus, in which he was interred on his death at Pisa, in 1498. His color was light in tones; his technique smooth in quality; his subjects were interpreted with a religious feeling and poetic naturalness, each detail being painted with a goldsmith's love for the decorative quality. His story-telling quality is his greatest achievement, revealing his varied interests as a portrait painter, landscape painter, animal painter, costumer, architect, and decorator. His easel pictures are rare. The best known are two "Madonnas with Four Saints," in the Gallery of Perugia, and in the National Gallery, London; and the "Apotheosis of Saint Thomas Aquinas," in the Louvre. Consult: Vasari, *Vite*, ed. by Milanesi (Florence, 1878-85; English translation, Blashfield and Hopkins, vol. ii. (New York, 1897); Lübke, *Geschichte der italienischen Malerei*, vol. i. (Stuttgart, 1878); P. Lasinio, *Pitture a fresco del Campo Santo di Pisa* (Florence, 1832).

GRAAF, gräf, Regnier de (1641-73). A celebrated Dutch physician, born at Schoonhoven. He studied under Sylvius at the University of Leyden. In 1664 he published his *Disputatio Medica de Natura et Usu Succi Pancreatici*, which gained for him a great reputation. After a short residence in France, where he took his doctor's degree at Angers in 1665, he returned to Holland, and settled at Delft. He discovered, in 1672, the follicles of the ovary which are named after him. He published several dissertations on the organs of generation in both sexes, which involved him in a controversy with Swammerdam. An edition of his complete works was first published in 1677.

GRAAFIAN FOLLICLES, or **VESICLES**. See Graaf; Ovary.

GRAAF REINET, gräf rī'nĕt. The capital of a division of the same name in Cape Colony, situated on the Sunday River, 184 miles by rail from Port Elizabeth (Map: Cape Colony, J 8). Its railway connections with the coast give it considerable commercial importance. In the vicinity are mineral springs. Population, in 1891, 5946.

GRAAL, grāl, Holy. See Grail, The Holy.

GRAB (Marathi *gurāb*, *ghurāb*, from Ar. *ghurāb*, from *gharaba*, to go). The Anglo-Indian name for the large flat-bottomed coasting vessel, of 150 to 300 tons, used on the coast of Hindustan. It has usually two masts. Its most peculiar feature is the extension of the upper deck over the projecting prow, the extension being separated from the forecastle by a bulkhead. When armed, as many of them were in the days of the Indian Marine, these vessels carried 12-pounders, or guns of less calibre. They were also used at one time by the native pirates of the coast.

GRÄB, grāb, Karl (1816-84). A German architectural and landscape painter, born in Berlin, where he studied under the Court Theatre painter, I. Gerst, and at the Academy. In 1839 he set out to travel in Switzerland, Southern France, the Pyrenees, Italy, and Sicily, and after his return, in 1843, was for several years associated with Gerst in decorative work; but about 1851 devoted himself almost exclusively to the painting of easel pictures, cultivating architectural subjects, especially the interior of mediæval churches, which he depicted with a rare knowledge of perspective and architectural detail, vigorous coloring, and beautiful light effects. Among the finest of these views are: "Choir in the Cathedral at Halberstadt" (1854), Ravené Gallery, Berlin; "The Scaliger Tombs in Verona" (1859); "Tombs of the Mansfeld Family in Saint Andrews at Eisleben" (1860) and "Lectern in Halberstadt Cathedral" (1870), both in the National Gallery, Berlin; "Interior of Old Synagogue in Prague" (1876), in the Breslau Museum. His landscapes are likewise of a high order, and in water-colors he painted, by royal order, ninety-four masterly views from the castles of Stolzenfels, Potsdam, Charlottenburg, and others. In the new museum at Berlin he executed two mural paintings of ancient Athens and Olympia. He was made Court painter in 1851, professor at the Academy in 1855, and was awarded the great gold medal at the Berlin Exhibition in 1854.

GRABBE, gräb'be, Christian Dietrich (1801-36). A German dramatist, born at Detmold. He studied law at Leipzig and Berlin, and wrote his first drama at eighteen, *Herzog Theodor von Gothland*. He then went on the stage, and after failing as an actor, returned to the law, and finally obtained a military position in his native town (1827). This he did not keep long, owing to his irregular life, and he ultimately died from the effects of continued drinking. His plays further include: *Don Juan und Faust* (1829); *Friedrich Barbarossa* (1829); *Heinrich VI.* (1830); *Napoleon oder die Hundert Tage* (1831); and *Hannibal* (1835). His dramas betray dramatic power of a very high order, but are marred by eccentricities of language and

faulty construction. His complete works were published at Leipzig in 1870, and at Detmold in 1874. Consult also Ziegler, *Grabbes Leben und Charakter* (Hamburg, 1855).

GRABE, grä'be, JOHN ERNEST (1666-1711). A German biblical and patristic scholar. He was born at Königsberg, and was educated there. Becoming dissatisfied with the Lutheran Church, he thought of joining the Catholic Church; but changed his mind and betook himself to England instead. He settled at Oxford in 1695, and won distinction by his editions of the Fathers, and particularly of the Septuagint (1707-19). He died in London, November 3, 1711.

GRABEN-HOFFMANN, grä'ben hôf'mân, GUSTAV. See HOFFMANN, GUSTAV GRABEN-.

GRABOW, grä'bô, WILHELM (1802-74). A Prussian politician, born at Prenzlau (Brandenburg). He studied at Berlin, became councilor of the city court, and was a prominent Liberal member of the United Diet of 1847-48, and of the National Assembly of 1848, acting for a short time as its president. From 1862 to 1866 he was repeatedly elected president of the Lower Chamber of the Prussian Diet. He was a consistent opponent of Bismarck in Prussian politics.

GRABOWSKI, grä-bôv'skê, MICHAL (1805-63). A Polish author, born in the Government of Kiev. He was one of the group of Ukrainians who gathered about Groza, Zaleski, and Goszczynski, and was an ardent defender of romanticism. Besides critical writings, he wrote some novels in the manner of Scott. His works include: *Literatura i Krytyka* (1837-40); *Korrespondencya literacka* (1843-48); *Koliszczyzna i Stepy* (1838); *Stannica hulajpolska* (1841); *Zamieć w stepach* (1862); *Taikury* (1845); *Pan starosta Kaniowski* (1856); *Pamietniki domowe* (1845); and an interesting work on *The Ukraine as It Was and as It Is* (1850). He also contributed critical articles to the magazines.

GRACCHANUS, grăk-kä'nŭs, M. JUNIUS. A Latin author, who, according to Pliny, assumed his cognomen on account of his friendship with C. Gracchus. He wrote a treatise, *De Potestatibus*, addressed to T. Pomponius Atticus, the father of Cicero's friend, in which he gave an account of the Roman constitution and magistracies from the time of the kings. This work is lost, but it is frequently cited by Pliny, Varro, and Cicero, and parts of it are preserved in the *De Magistratibus* of Joannes Lydus. Consult: Gerlach, *Geschichtschreiber der Römer* (Hamburg, 1851); Mercklin, *De Junio Gracchano* (Dorpat, 1840-41); and Huschke, *Jurisprudentia Anteiustiniana*, 5e (Leipzig, 1886).

GRACCHUS. The cognomen of a distinguished branch of the Sempronia gens in ancient Rome. Many of the name became famous in history. The following are the most important:

TIBERIUS SEMPRONIUS GRACCHUS (?-B.C. 212). A general during the Second Punic War. Elected consul in B.C. 215, when Hannibal was scouring Campania and Apulia, he gathered a force of volunteer slaves and provincials, and routed the Campanians with great loss near Cumæ, which he seized and held against the assaults of Hannibal's army. At the end of his consulship, his *imperium* (q.v.) was continued, so that he could spend the year 214 in Apulia, with headquarters at Beneventum, from which the Carthaginian general Hanno tried in vain to dislodge him. He was consul again in 213, and carried on an active war in Lucania. In 212, while again operating in Apulia, he was betrayed, and perished in an unequal struggle with Mago the Carthaginian. Hannibal gave him the honor of a public funeral.

TIBERIUS SEMPRONIUS GRACCHUS (c.210 B.C.-?), statesman and general. As a young man he served on the staff of the consul L. Cornelius Scipio in Greece (B.C. 190); was tribunus plebis in 187; prætor in 181, with administration in Spain, where he brought the wild Celtiberian tribes under Roman control; consul in 177. He crushed a formidable revolt in Sardinia, and returned to celebrate his triumph with large numbers of captives. As censor in 169 he constructed the Basilica Sempronia, near the Roman Forum. He was special envoy in Asia Minor in 164, and consul again in 163. The year of his death is not known. He married Cornelia, daughter of P. Scipio Africanus, by whom he had twelve children, all of whom died young but three—two sons, the famous Gracchi, and a daughter.

TIBERIUS SEMPRONIUS GRACCHUS, son of the preceding (c.163-133, B.C.). As their father died when they were very young, Tiberius and his brother Gaius (see following page) were brought up under the special care of their mother, Cornelia. Tiberius had his first military experience in Africa, on the staff of his brother-in-law, Scipio Africanus the Younger, and took part in the capture and destruction of Carthage (B.C. 146), on which occasion he is said to have been the first Roman to scale the city wall. In B.C. 137 he acted as quæstor to the army of the consul Hostilius Mancinus in Spain, where the people of Numantia would treat with no other Roman than the son of their former benefactor. He was thus enabled to save from utter destruction an army of 20,000 Romans, who had been defeated and were at the mercy of the Numantines. But the peace was considered disgraceful by the aristocratic party at Rome, and was repudiated. On their return to Rome, the consul was disgraced, as being wholly responsible, but Tiberius was held in high esteem by the populace, who saw in him a champion of justice. His interest in the cause of the common people was roused by the sight of the vast estates of wealthy Romans worked by gangs of slaves, while the poor free citizens had neither land nor means of employment. He determined to dedicate himself to the reform of this deplorable state of things, and became a candidate for the tribuneship, to which he was elected in B.C. 133. The bill which Tiberius, as tribune, now proposed involved a renewing of the Licinian Rogations (q.v.), with many modifications designed to lighten the hardships of those who, in good faith or profiting by the laxness of a century or more, had acquired 'title' to the public domain. Such a bill was to be submitted to the vote of the people, tribe by tribe, in the *comitia tributa*. Its popularity was manifest, and its passage was assured, when the opposition found a means to block its way, at least temporarily. One of the tribunes, Cæcina, was induced to put a veto on the measure, and the veto of a tribune overweighed even the voice of the tribes themselves. Tiberius was forced to impeach the tribune, an unheard-of measure and one which laid him open

to the charge of unconstitutionality. The *comitia tributa*, however, voted to depose Cæcina, and the obstacle was removed. The bill was thus passed, and a committee of three (*triumviri*) was appointed to carry out its provisions, consisting of Tiberius himself, his brother Gaius, and Appius Claudius. Not content with the aid given to small farmers by his new law, Tiberius now devised further means of aiding them to begin life with live stock and implements. He suggested that the wealth bequeathed to the Roman people by Attalus, King of Pergamus, should be devoted to this purpose. When the term of his tribuneship came to an end, he presented himself again for the office, as a measure of self-defense, though this was most unusual. The election took place in June, when the mass of his supporters were busy in the country, and when everything was favorable to the intrigues of his opponents. Partisan feeling ran very high, threats and calumnies were rife, and the election was marked by terrible riots, in one of which Tiberius himself was killed.

GAIUS SEMPRONIUS GRACCHUS, younger brother of the preceding (B.C. 159-121). When Tiberius was murdered, Gaius was serving with the army in Spain. He returned to Rome a year or two after, but took no part in public affairs other than to deliver speeches in court, where his eloquence met with telling effect. Upon attaining the quæstorship (B.C. 126), he went with the armies to Sardinia. He had a strong feeling that he should return to Rome to avenge his brother's death and take up his work, and it is said that in his dreams Tiberius's shade appeared and urged him on. Accordingly, before his term as quæstor had expired, he left Sardinia unexpectedly and went to Rome, to the discomfiture of his enemies and political opponents, who feared him, and did not hesitate to resort to persecution and groundless accusations. Gaius stood for the tribuneship, and was elected in B.C. 123. He now renewed the enforcement of his brother's laws, which had gradually been allowed to lapse, and carried out wise and important legislation—but all in the interest of the people as opposed to the Senate and the nobles. To develop the resources of Italy, and at the same time to employ the poor, he made new roads throughout all parts of the country, repaired old ones, and erected milestones. He was reëlected tribune in B.C. 122, with his friend and supporter, the ex-consul Fulvius Flaccus, among his colleagues. He now proposed a measure for the extension of the Roman franchise to all the Latins, offering at the same time 'Latin franchise' to all the Italian allies of Rome. The aristocratic party, finding it impossible to check his reforms by open opposition, had recourse to the trick of offering, in bad faith, still greater advantages through the demagogue M. Livius Drusus, thus undermining Gaius's influence with the people. Events drifted into civil war. But Gaius and Fulvius Flaccus were now deserted by most of their supporters; hard pressed by the consul Opimius, they were compelled to take refuge on the Aventine Hill. Negotiations proved of no avail. Flaccus and his eldest son were murdered, and Gaius, trying in vain to escape across to the Janiculum, but seeing all hope gone, ordered his faithful slave to kill him, who then also killed himself (B.C. 121).

GRACE (from Lat. *gratia*, favor). An expression frequently used in the Scripture and theological discussion. Its distinctive meaning is the idea of free and unmerited favor. It is a benefit springing out of the liberality and free-heartedness of the giver, and bestowed without any hope or expectation of reward. Applied to God in the New Testament and in theology, it denotes the free outpouring of His love to man; and when man, on the other hand, is said to be in a state of grace, it implies that he is in the enjoyment of this divine love and favor. Saint Paul differentiates grace and works, and emphasizes the necessity of the former to salvation. Theologians have distinguished grace into *common* or *general* and *special* or *particular*. Common grace is employed to denote the love which God has to all His creatures, and the light of nature and of conscience which they all enjoy. Special grace is the outflow of the love of God for lost sinners, by which He brings them to repentance, and saves them. This special or saving grace is sometimes also divided in various ways, and spoken of as *selecting, justifying, sanctifying* grace; also, in respect of man, as *imputed* or *inherent* grace—the grace, that is, of Christ's righteousness imputed or reckoned to the account of those who believe on Him, and the grace of holy and pious dispositions wrought in the heart by the spirit of God. Grace is also spoken of as *efficacious* and *irresistible*, and the relation in which the elect or believing people stand to God is represented as a *covenant of grace*, in contrast with the primitive relation which Adam bore to his Maker before the fall, which is called a *covenant of works*. These theological distinctions are not to be found, at least in their more technical sense, in the New Testament. The *charis* of Saint Paul is not a logical distinction, but a spiritual fact. It is the loving aspect of God toward the sinner, toward all sinners, whereby all who confess their sins have free access into His favor, and receive the 'adoption of sons.'

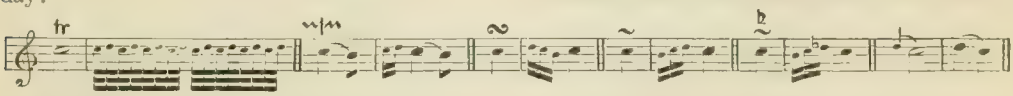
GRACE, DAYS OF. A period allowed for the payment of a negotiable instrument, as a bill of exchange or promissory note, in addition to the time named in the paper itself. As the title indicates, this additional period was formerly a matter of indulgence or favor on the part of the holder. It has long been recognized by the courts as a matter of right. Chief Justice Marshall declared, nearly a century ago, that "the allowance of days of grace is a usage which pervades the whole commercial world. It is now universally understood to enter into every bill or note of a mercantile character, and to form so completely a part of the contract that the bill does not become due, in fact or in law, on the day mentioned on its face, but on the last day of grace." Paper payable on demand has always formed an exception to this rule; and days of grace have been abolished in several European countries and in a number of our States. The number of days varies in different countries from three to thirty. In Great Britain, and generally in this country, the number is three. Accordingly if a bill or note is dated February 1st, and is payable three months after date, it matures May 4th; that, and not May 1st, is the proper day on which to demand payment, and on which it is dishonored by non-payment. If the last day of grace

falls on Sunday or a great holiday or a bank holiday, the paper falls due on the second day of grace. The number of days to which a particular bill or note is entitled depends on the law of the place where it is payable, not of that where it is drawn, made, or indorsed. Consult the authorities referred to under NEGOTIABLE INSTRUMENT.

GRACE, WILLIAM RUSSEL (1832-1904). An American merchant and politician, born in Queen's County, Ireland. He ran away from home when fourteen years old, and worked his way on a sailing ship to New York City. In 1850 he went to Callao, Peru, where he became a clerk in the firm of Bryce & Co., shippers and commission merchants. Two years later he was admitted to partnership and finally became the leading member of the firm, the name of which was changed to Grace Bros. & Co. He returned to New York in 1865 and organized the firm of W. R. Grace & Co., to trade with South and Central America, and in 1891 established the New York and Pacific Steamship Company. He was elected Mayor of New York on the Democratic ticket in 1880 and again in 1884.

GRACE ABOUNDING TO THE CHIEF OF SINNERS. A work by John Bunyan, written in prison, and published in 1666. It is autobiographical, and one of the three great works on which this author's reputation rests.

GRACE-NOTES. Mere embellishments, not essential to either the melody or harmony of a composition. They are called for by special signs, or are written in notes of smaller type. During the sixteenth and seventeenth centuries the introduction of grace-notes was left chiefly to the intelligence and taste of the performers. But this led to the abuse of overloading a composition by means of useless and often tasteless ornaments, so that J. S. Bach did not leave them to the performers, but took great pains in writing out in detail whatever embellishments he wished. Since Beethoven all grace-notes are written by the composer. Although the original function of these embellishments was merely to render a composition more 'elegant,' and can be left out without detriment to the music, Chopin completely revolutionized the employment of grace-notes by using them in a novel and entirely original manner, so that in his works they become a means of deep emotional and artistic expression. In Chopin's compositions the grace-notes form an essential part, and cannot be altered or omitted without seriously affecting the character of his music. In the works of older composers an endless number of signs indicating various manners of ornament are found. Only the following signs are universally employed today:



The first of these signs is the *trill*, the second the *mordent*, the others the *turn*. The sixth is an example of the appoggiatura, which is still found in the works of Haydn and Mozart. This grace-note borrows half the value of the note before which it stands. It is not written in modern music. Originally it was employed by conscientious composers in order to avoid the old rule forbidding the unprepared entrance of dissonances (anticipation).

GRACES (Lat. *Gratiæ*, Gk. Χάριτες, *Charites*). In Greek mythology, originally goddesses of heavenly light, who bring fertility to the fields, and joy to men. Like all such divinities, they are at first anonymous and of varying number, and this is reflected in the local variations in their cult and names throughout Greece. At Orchomenus, in Bœotia, they had a very venerable shrine, where they were worshiped under the form of three stones, said to have fallen from heaven. In Hesiod we find them called Aglaia, Euphrosyne, and Thalia, and these names attached themselves to the Orchomenian cult, and later spread through Greece. At Sparta they were two in number, Kleta and Phaënna, and the same number seems original at Athens, where the names were Auxo and Hegemone; later Thallo, originally one of the Horæ (q.v.), was joined with them, and this triad appears in the oath taken by the Athenian ephebi. Their early connection with the bloom of nature was soon obscured by the conception of goddesses of the joy of life and beauty, present at the dances and feasts of the gods, and closely joined with Hera, as marriage goddess, and above all with Aphrodite. The legend represented them as daughters of Zeus and Eurynome. In art the triad prevails, and until the end of the fourth century they always appear fully draped. In the third century the growing connection with Aphrodite leads to a change; they now appear slightly draped, or wholly nude, and usually embracing one another, or clasping hands.

BIBLIOGRAPHY. Usener, *Götternamen* (Bonn, 1896); Furtwängler in Roscher, *Lexikon der griechischen und römischen Mythologie* (Leipzig, 1884-86); Preller-Robert, *Griechische Mythologie* (Berlin, 1894); Escher, in Pauly-Wissowa, *Realencyklopädie* (Stuttgart, 1889), very full references. For the view that there were three charites at Athens, consult Robert, "De Gratiis Atticis," in *Commentationes in Honorem Mommseni* (Berlin, 1877).

GRACIAN, grä'thē-än', BALTASAR (c.1584-1658). A Spanish author, born at Calatayud, Aragon. He was a Jesuit preacher, and he became rector of the College of Tarragona. His works were often published under the name of his brother Lorenzo. *La agudeza, y arte de ingenio* (1649) was a book which had a great vogue in its day, and influenced an entire school of followers called Gracianists. Gracian belonged to the cult of Euphuists; his style was obscure and affected, but he was a keen observer and at times a powerful writer. Schopenhauer, who translated Gracian's *Oráculo Manual* ("Maxims of Conduct") into German, calls his *El Criticón* (1650-64) "one of the best books in the world." His other works are: *El héroe* (1637); *El discreto* (1646); and *El político Don Fernando el Católico* (1641). Consult Borinski, *Baltasar Gracian und die Hoflitteratur in Deutschland* (Halle, 1894).

GRACIOSO, grä'thē-ō'sō. A stock comedy character in sixteenth and seventeenth century Spanish drama, similar to the euphuistic and 'fantastical' knight of the Elizabethan stage. The type originated with Lope de Vega.

GRACKLE. See GRAKLE.

GRADE CROSSING. The intersection of a railroad track or right of way with a highway or private road or another railroad. The corresponding phrase in England is 'level crossing.' It is the duty of a person using the highway or private road at such crossing to exercise due care in looking and listening for approaching trains. What amounts to due care depends largely upon the facts of each case; such as the distance which the traveler can see along the track, the ease with which he can traverse the crossing or retreat from a point of danger, and the signals which are given by the road. On the other hand, the railroad is also bound to exercise due care in warning travelers of the approach of its trains, and in attempting to avoid collision with those using the crossing. In the absence of a statute or ordinance requiring gates or guardsmen at crossings, failure to supply them is not negligence on the part of the company. Acts of Parliament require all English railroads to maintain gates at level crossings, with proper persons to open and close them; to slacken speed to four miles an hour at such crossings adjoining a station, and prohibit shunting at such crossings. It is also their duty to keep level crossings in proper repair and to open gates promptly for travelers. Similar statutes exist in some of our States. Even though a railroad company fails to do its duty at a grade crossing, it will not be liable in damages to a person whose injury is not solely due to such failure, but is due in part to his own carelessness. He is not entitled to recover if his own negligence contributed to the accident. See NEGLIGENCE; CARRIER, COMMON; RAILWAYS, and the authorities there cited.

GRÄDENER, grā'de-nēr, HERMANN (1844—). An Austrian musician, a son of Karl Grädener. He was born at Kiel. After studying with his father he attended the Vienna Conservatory. He taught violin at several music schools of Vienna, and in 1899 began to lecture on harmony and counterpoint at the university there. He is also conductor of the Vienna Singakademie. He has written a number of meritorious compositions for orchestra, chamber-music, and pianoforte.

GRÄDENER, KARL (1812-83). A German musician, born at Rostock. After studying music under Violoncellist Mattstadt and others, he was engaged at Helsingfors and subsequently at Kiel, where for ten years he was director of music at the university. From 1851 to 1861 he conducted the singing academy which he had founded at Hamburg. After an association of three years with the Vienna Conservatory he was appointed president of the Tonkünstler-Verein of Hamburg. His excellent choral works include the oratorio *Johannes der Täufer*. His other compositions, which are distinguished by fine harmonic effects, include two symphonies, the overture to "Fiesco," a pianoforte concerto; and considerable chamber-music.

GRADENIGO, grä'dâ-nē'gô, PIETRO (1249-1311). A Doge of Venice, elected in 1289. Under him the law was passed suppressing election for the recruitment of the Council of Forty and leaving to the aristocracy the choice of its members. Gradenigo was involved in various wars, especially against the Genoese (1294-99). In 1310 he defeated the conspiracy of the Tiepoli.

GRAD'GRIND, THOMAS. A thoroughly practical utilitarian in Dickens's *Hard Times*.

GRADISCA, grâ-dīs'kâ. A town of Austria in the coast district of Görz and Gradisca, on the right bank of the Isonzo, near the Italian frontier, about 30 miles northwest of Triest (Map: Austria, C 4). It has an ancient citadel and a large silk-mill. The old fortifications have been destroyed and replaced by fine squares and promenades. Population, in 1890, 3352; in 1900, 3843. Gradisca was the capital of the old county of Gradisca.

GRADUAL. (1) In the liturgy of the Roman and other Western churches, that portion of the mass which intervenes between the epistle and the gospel, and consists of a few verses of the Holy Scriptures, generally taken from the Psalms. It was originally called the 'Responsum,' or 'Cantus Responsorius;' but, probably for the sake of distinguishing it from other portions of the service called by the same name, its present appellation has been substituted. The name is derived from the place at which this response was chanted, and which was either the ambo, or chanting pulpit, which is approached by steps (*gradus*), or the steps themselves, whether of the ambo or of the altar. Originally, as we find from Saint Augustine, the gradual consisted of an entire psalm, and in the mass of the first Sunday in Lent the entire ninety-first (ninetieth in the Vulgate) psalm is chanted. In the Ambrosian liturgy the gradual is partly from the Old and partly from the New Testament. The gradual, in the Roman liturgy, is always followed by the 'Alleluia,' except in penitential time, when a slow and mournful chant, called the 'tract,' is substituted. (2) The liturgical book which contains the music of the part of the mass sung by the choir. The official editions now current were published at Regensburg by the Congregation of Rites, folio in 1872, octavo in 1877.

GRADUAL PSALM, PSALM OF THE STEPS, or SONG OF DEGREES (Heb. *shîr hamma'aloth*, Gk. ᾠδὴ ἀναβαθμῶν, *odē anabathmōn*, Lat. *canticum graduum*, song of the steps). A name given, both by the Hebrews and in the Christian service books, to one of the fifteen psalms, cxx.-cxxxiv. (in the Vulgate cxix.-cxxxiii.). The origin of the name is uncertain. In rabbinical literature it is traced to a legendary incident connected with the building of the second temple, or explained as an allusion to the fifteen steps by which the temple was reached (Ezek. xl. 22 sqq.). The most plausible opinion is to connect these psalms either with the 'going up' from Babylon to Jerusalem or with the 'ascent' of the temple mount. In either case the psalms would be 'pilgrim's songs,' and the contents, though reflecting political and religious conditions of various periods, all emphasize the longing of the pious Israelite for Jehovah's temple or express his joy upon beholding it. The composition of the entire series belongs to the post-exilic period of Hebrew literature. They are not the work of a single hand, nor were they produced at a single time, being united simply by the same heading attached to each one. They form part of the fifth division of the Psalter. These psalms in the Roman Catholic Church are recited on each Wednesday in Lent. See PSALMS.

GRADUATION (ML. *graduatio*, from *graduare*, to give a degree, from Lat. *gradus*, degree,

step, from *gradi*, to walk). The art of laying off scales of measurements, as the tape, protractor (q.v.), or vernier (q.v.). The simplest problem in graduation is the dividing of a straight line, such as the linear scale, or rule. Standard scales being abundant, it is only necessary to make a careful copy of an original. If the material used is wood or iron, the divisions may be marked off by the use of a dividing square and knife-edge. The dividing square is simply a piece of steel in the form of an L, one arm of which may be moved from one division of the scale to another, while the other arm serves to guide the knife in marking the new scale. The original graduation of linear scales into equal divisions was performed either on the principle of bisection or of 'stepping.' In the case of bisection, beam or extension compasses (see COMPASSES) serve to describe an arc from each end of the line to be graduated, so as to locate the bisection point. The two arcs drawn by the compasses cannot be made to touch with sufficient precision for accurate dividing. The small interval between the arcs may be divided by the aid of a microscope and delicate compasses, thus approaching more nearly the bisection point of the original line. In the same way, each segment may be divided again, and so on. It is evident that all divisions cannot be effected by bisection, hence such instruments as the diagonal scale (q.v.) are employed. 'Stepping' is performed with delicately pointed compasses, which are adjusted as nearly as possible to the length of a required division. Beginning at one end of the line, the compasses are turned round each leg alternately until the whole line is stepped off. If the last step falls short of or beyond the end, the compasses are adjusted accordingly, and the process is repeated until the desired accuracy is attained. The method of bisection is more accurate in practice, and was adopted by Graham (1725), Bird (1767), Ramsden, Troughton (1809), and other eminent instrument-makers in original graduation. Curved lines may also be graduated on this principle. Since the chord of an arc of 60° is equal to the radius of the circle, the circumference may be divided into six equal parts with a precision depending only on the delicacy of the instruments. Further division depends upon bisection. The amount of care, patience, skill, and delicacy of touch required in the original graduation of important astronomical instruments is such that comparatively few men have been found competent for the task, and these have been almost as famous as the astronomers who have successfully used the instruments. The necessity of extreme accuracy in graduating a scale will be understood by considering the application that is made of these divisions. The mariner, for example, determines his latitude by taking the meridian altitude of the sun. For this purpose he uses a sextant, the arc of whose limb corresponds to the curved surface of the globe. Whence the real error in latitude bears the same ratio to an error in the scale that the earth's radius bears to the radius of the arc. If each degree occupied an arc of $\frac{1}{6}$ of an inch, an error of $\frac{1}{100}$ of an inch in a division would thus mislead the mariner to an extent of more than four statute miles as regards his position at sea. But a ship's quadrant is a rude instrument compared with astronomical transits for measuring celestial angular distances by means of a divided arc; in these, a deviation of a thousandth part of an inch is regarded as a serious error.

The methods of original graduation above described are used only for the largest and most important astronomical or geodetic instruments. Ordinary instruments are graduated by dividing-plates or engines, which copy and adapt a standard set of divisions. The dividing-plate which is used for common purposes, such as dividing compass-rings, theodolites, and sextants, is a divided circle with a straight-edge, made movable on the axis or arbor of the plate in such a manner that its edge during every part of its revolution shall fall in the exact line from centre to circumference. The ring, protractor, or other instrument to be divided, is clamped upon the plate with its centre exactly coinciding with that of the plate, and the straight-edge is moved round, and made to halt at the required divisions on the circumference of the dividing-plate; and by using the steel straight-edge as a guide, corresponding divisions are marked off upon the concentric arc of the instrument to be divided. The dividing-engine is a very complex machine, requiring the greatest accuracy and care in its construction. Among the styles of dividing-engines may be mentioned the English types of Ramsden (1777), Troughton (1793), Simms and Ross, the German types of Reichenbach, and the French type of Gambey. A detailed account of these would far exceed the limits of this article. Their principal parts consist of a large toothed circle, graduated with extreme care by original division; a very carefully constructed endless screw works in these teeth, and is moved through any given number of revolutions, or any measured fraction of a revolution, by means of a treadle or other suitable power, thus making the requisite steps for each division, another part of the machine cutting a fine line at the moment of the halt of each step. These divisions are cut upon an arc of silver, gold, or platinum, which is soldered or inlaid upon the limb of the instrument, the precious metals being used on account of the oxidation to which common metals are liable.

Consult: Bird, *Method of Dividing Astronomical Instruments* (London, 1767); Ramsden, *Description of an Engine for Dividing Mathematical Instruments* (London, 1777); and "Memoir" of Troughton, in *Philosophical Transactions* (London, 1809). For history of efforts at graduation and notes on the modern methods, consult Watkins, "The Ramsden Dividing Engine," in *Smithsonian Report* (Washington, 1890).

GRA'DUS AD PARNAS'SUM (Lat., steps to Parnassus). (1) A name applied to a Latin or Greek dictionary, in which the vowel quantities are marked, and which hence is useful in verse composition. (2) The name was also used as the title of a Latin work on composition and counterpoint by J. J. Fux (1725), and of a French work on the art of piano-playing by Clementi (1817).

GRA'DY, HENRY WOODFEN (1851-89). An American journalist and orator. He was born at Athens, Ga., 1851, and after being educated at the University of Georgia at Athens, he began his work as a journalist in a series of letters on the resources of his native State, which attracted much attention. In 1880 he purchased an interest in and became editor of the Atlanta *Constitution*, as which he remained till his death, contrib-

uting also articles to various magazines on the prospects and conditions of the South. In 1886 he delivered a remarkable speech before the New England Society in New York on "The New South," which was widely copied throughout the country. A few days before his death he delivered another notable oration in Boston on "The Future of the Negro." He died at Atlanta, Ga., December 23, 1889. A public hospital and a monument in Atlanta commemorate his services, which were important in themselves and were especially influential on account of the fact that Mr. Grady was one of the first prominent representatives of the New South to express the willingness of that generation and section to throw in their lot with the rest of the nation. For his *Life*, consult Lee (New York, 1896), in which also some of his speeches and articles are included.

GRÆÆ (Lat., from Gk. *Γραῖαι, Graiai*, from *γραῖα, graia*, old woman). Dino, Enyo, and Pephredo, daughters of Phorcys and Ceto, thence called Phorcydes. Sisters and guardians of the Gorgons, they are described by Hesiod as fair-faced, gray-haired from birth, and possessing between them but a single eye and tooth, which they had to use in turn. Perseus craftily stole the eye and the tooth, and restored them only when the Grææ instructed him how to procure the articles by aid of which he was to behead Medusa. See GORGO; PERSEUS.

GRÆCOS'TASIS (Lat., from Gk. *Γραικόστασις, Graikostasis*, Greek place). A hall near the Temple of Concord in the Roman Forum. It served as the place of assembly for foreign ambassadors, who there awaited the summons to appear before the Roman Senate.

GRAEFE, grā'fe, ALBRECHT VON (1828-70). A German ophthalmologist. He was born in Berlin, where his father, Karl Ferdinand von Graefe, a noted surgeon, held a professorship at the university. Graefe took his medical degree in Berlin in 1847, and then pursued the special study of ophthalmology in Prague, Vienna, Paris, and London. In 1850 he returned to Berlin and founded there a private hospital for diseases of the eye. By means of his investigations and his success in difficult operations, he soon became recognized as the leading authority in this branch of medical science. He founded in 1855 the *Archiv für Ophthalmologie*, and was the author of numerous scientific monographs of great value. In 1857 he was made professor extraordinary, in 1866 ordinary professor, of diseases of the eye. Graefe may be regarded as the founder of modern ophthalmology. The invention of the ophthalmoscope by Helmholtz in 1851 opened up new possibilities to the science, of which Graefe hastened to take advantage. By use of the instrument he improved vastly the methods of cure for glaucoma. He also introduced new operative methods in cases of strabismus, which established a favorable prognosis in many cases which until then had been considered hopeless. Graefe was also considered an authority on diseases of the brain, and was the first to recognize the importance of diseases of the eye in the diagnosis of such cases. Consult: Michaelis, *Albrecht von Graefe, sein Leben und Wirken* (Berlin, 1877); Jacobson, *Albrecht von Graefes Verdienste um die neuere Ophthalmologie* (Berlin, 1885); and Alfred Graefe, *Ein Wort zur Erinnerung an Albrecht von Graefe* (Halle, 1870).

GRAEFE, ALFRED KARL (1830-99). A German physician; cousin of Albrecht von Graefe. He was born at Martinskirchen, studied medicine in various German universities and in Paris, acted as an assistant to Albrecht von Graefe in Berlin from 1854 to 1858, and afterwards was professor of diseases of the eye at Halle, which position, however, he resigned in 1892. He founded at Halle an ophthalmic hospital which attracted many thousands of patients, and devised a method of operating whereby, without injury to the eye, parasites deeply lodged in that organ could be removed. He wrote a number of papers on ophthalmology, and published, in conjunction with Sämisch, *Handbuch der gesammten Augenheilkunde* (1874-80).

GRAEME, grām, MALCOLM. The King's ward in Scott's *Lady of the Lake*, who goes over to the side of the rebel Douglas, but is finally pardoned through the interposition of the outlaw's daughter Ellen.

GRAEME, ROLAND. Lady Avenel's page in Scott's *Abbot*, who is finally discovered to be the rightful heir of Avenel Castle.

GRAESSE, grēs'se, JOHANN GEORG THEODOR (1814-85). A German antiquary, born at Grimma and educated at Leipzig. He was appointed director of the Royal Numismatic collection at Dresden (1878), from which position he retired in 1882. Graesse's more important writings are: *Lehrbuch einer allgemeinen Litterargeschichte* (1837-59); *Trésor de livres rares et précieux* (1858-69); a translation of the *Gesta Romanorum* (1842); an edition of the *Legenda Aurea* (1846); *Die Sage vom ewigen Juden* (1844); *Die Sage vom Ritter Tannhäuser* (1846); *Beiträge zur Litteratur und Sage des Mittelalters* (1850); *Geschlechts-, Namen- und Wappensagen des Adels deutscher Nation* (1876); *Des deutschen Landmanns Praktika* (1858); the very valuable guide to Latin geographical names, *Orbis Latinus* (1861); the guides and text-books: *Handbuch der alten Numismatik* (1853); *Guide de l'amateur d'objets d'art et de curiosité* (2d ed. 1877); *Guide de l'amateur de porcelaines et de poteries* (9th edition by Jännicke, 1901); and *Unsere Vor- und Taufnamen* (1875). In 1878 he began to edit a *Zeitschrift für Museologie*.

GRAETZ, grēts, HEINRICH (1817-91). A Jewish historian, born at Xions, Province of Posen. After an academic course at the universities of Berlin and Jena, where he graduated in 1845, he was for some time a preacher, but, finding himself unsuited for this career, devoted himself to teaching, and became an instructor at the Breslau Seminary in 1854. Here he remained until 1870, when he received a professorship at the University of Breslau. His principal work is the history entitled *Geschichte der Juden von den ältesten Zeiten bis auf die Gegenwart* (1853-70; popular edition 1888-89). The work is skillfully arranged, and, although somewhat unequal in merit—the first four volumes being the best—it evidences minute research. It has been translated into Hebrew, Russian, French, English, and several other languages, and parts of it have been frequently reprinted.

GRAF, gräf (Ger., count). In the early Middle Ages an Imperial or royal officer, like the

comes of the Roman Empire, but whose office gradually developed into an hereditary feudal grade. The word appears in English in its compounds, margrave, or marquis (Markgraf), landgrave (Landgraf), and burgrave (Burggraf), and is also frequently used in the simple German form. The graf, in all probability, was originally a fiscal officer, whose duty it was to collect the revenue of a district. The title first appears in the *Lex Salica* (compiled in the fifth century), under the Latinized form of *grafio;* at a later period the office is often designated by the Latin equivalent *comes.* Charles the Great divided his whole empire into graf-districts (*grafengaue*) or counties, each of which was presided over by a graf. The people were in the habit of appointing a representative called the *cent-graf* to attend to their interests with the graf, and probably, if necessary, to appeal from his decisions to the central Government. Then there was the *stall-graf,* or stable graf, the *comes stabuli,* or constable of later times; the *pfalzgraf* (*comes palatii*), who presided in the domestic court of the monarch, which was the highest court in the realm; the *send-graf,* who was sent as an extraordinary deputy of the King to control the ordinary *gau-grafen;* and lastly, the *mark-graf,* or marquis, on whom the important duty of defending the border-lands devolved. Consult: Waitz, *Deutsche Verfassungsgeschichte* (Berlin, 1874-85); Brunner, *Deutsche Rechtsgeschichte,* vol. ii. (Leipzig, 1892).

GRAF, Arturo (1848—). An Italian poet and critic. He was born at Athens, of German extraction, and was educated at the University of Naples. After lecturing at the University of Rome for several years, he was appointed to the chair of Italian literature at the University of Turin (1882). His publications include treatises on the history and development of art and kindred subjects, and the following poetic works: *Versi* (1874); *Poesie e novelle* (1876); *Medusa* (3d ed. 1890), characterized by a powerful lyrical strain; and *Dopo il tramonto, Versi* (1893). Sadness and a spirit of pessimism, combined, however, with a strong faith in science, are prevailing features of the poetry of Graf, who occupies a very high rank among the present poets of Italy.

GRÄF, grâf, Gustav (1821-95). A German historical and portrait painter, born at Königsberg; pupil of Hildebrandt and Schadow at Düsseldorf (1843-46). He then supplemented his studies in Antwerp, Paris, Munich, and Italy, and in 1852 settled in Berlin, where his first important work was the mural painting, "Subjugation of Wittekind by Charlemagne," after Kaulbach's design, in the cupola saloon of the New Museum. Among several historical genre scenes of sterling technique which followed, the "Patriotism of Ferdinand von Schmettau, 1813" (1863, National Gallery, Berlin) deserves especial mention. He next devoted himself with great success to painting portraits, among the best of which are those of Field Marshal von Roon (1882, National Gallery, Berlin); Du Bois-Reymond (1886); and Robert Koch (1891). In 1868-70 he executed the fresco paintings, impersonating "Jurisprudence" (Solon), "Art" (Phidias), and "Eloquence" (Demosthenes), in the Aula of the University at Königsberg. His more recent works include: "Prometheus and the Oceanids" (1886, Königsberg Museum); "Viking's Death" (1892); and "Will o' the Wisp" (1893). He was professor at, and member of, the Berlin Academy.

GRAF, Karl Heinrich (1815-69). A German Orientalist, born at Mülhausen in Alsace. He was educated in the school and college of his native place, and then at the gymnasium and Protestant Seminary of Strassburg (1830-32), and in the university of that city. He devoted himself to Old Testament exegesis and Eastern linguistics under Bruck and Russ, and studied later under Fleischer at Leipzig. In 1849 he became professor of French and Hebrew at Meissen. He retired in 1868. His Biblical criticism was independent and liberal. He wrote: *Der Segen Moses', Deuter. 33* (1857); *Der Prophet Jeremia erklärt* (1862); and *Die geschichtlichen Bücher des alten Testaments* (1866). But his work in Persian, especially on the poet Sa'di, is better known and more important. It includes: *Moslicheddin Sadis Rosengarten . . . übersetzt mit Anmerkungen* (1846); *Sadis Lustgarten* (1850); *Sadi le Boustan, texte persan avec un commentaire persan* (1858); "Die Moral des Sadi," in Reuss and Cunitz, *Beiträge zu den theologischen Wissenschaften* (1851); and editions and translations of quatrains, distichs, elegies, and ghazals of Sadi in vols. ix., xiii., xv., and xviii. of the *Zeitschrift der deutschen morgenländischen Gesellschaft.*

GRÄFE, Karl Ferdinand von (1787-1840). A German surgeon. He was born at Warsaw, studied medicine and surgery at Halle and Leipzig, became professor of surgery and director of the surgical clinic at Berlin in 1811, and during Napoleon's Prussian campaign superintended the military hospitals. During the war he became in 1813 a surgeon-general on the staff of the King of Prussia, and professor and finally (1822) vice-director in the Academy of Medicine and Surgery at Berlin. He was the founder of the surgical clinic and the polyclinic at Berlin, where his investigations and discoveries won for him a world-wide reputation. He was particularly well known for his autoplastic operations, in which he applied new methods, and made use of new instruments of his own invention, which revolutionized the existing method of treatment. Among his numerous published works are: *Rhinoplastik* (1818); *Die epidemisch-contagiose Augenblennorrhoe Aegyptens in den europäischen Befreiungsheeren* (1823), and the *Jahresberichte über das klinische chirurgisch-augenärztliche Institut* (Berlin, 1817-34).

GRÄFENBERG, grä'fen-bĕrk. A village in Austrian Silesia, 37 miles west-northwest of Troppau (Map: Germany, D 4). It is celebrated as the place where the water-cure was introduced in 1826 by Priessnitz. It is annually visited by about 2500 patients.

GRAFENBERG, grä'fen-bĕrk, Wirnt von. See Wirnt von Grafenberg.

GRAFF, gräf, Anton (1736-1813). A German painter, born at Winterthur, Switzerland. He was a pupil of Schellenberg in his native city, and then went to Ansbach, where he assisted the Court painter Schneider. Afterwards he was appointed Court painter, and was made professor at the Academy of Dresden (1766). He painted a great number of portraits of his contemporaries, nearly a thousand in all, and pre-

served in an honest and admirable manner the features of Lessing, Schiller, Mendelssohn, and many others of his celebrated contemporaries.

GRAFF, EBERHARD GOTTLIEB (1780-1841). A German philologist. He was born at Elbing, Prussia, and was educated at Königsberg, where he became professor of the German language in 1824. A pupil of Jacob Grimm and Lachmann, he followed in the footsteps of these eminent scholars, and produced several philological works distinguished by careful research, such as his valuable discussion on Old High German, entitled *Althochdeutscher Sprachschatz* (6 vols., 1835-43).

GRAFF, FREDERICK (1775-1847). An American engineer, born in Philadelphia. He learned the trade of a carpenter, and later became a skillful draughtsman. He was an assistant to H. B. Latrobe in the construction of the first Philadelphia water-works, becoming chief engineer and superintendent of the system in 1805. Subsequently he planned and constructed the new city water-works at Fairmount Park, introducing iron pipes and fire-plugs and stop-cocks of his own invention. The success of this system won for him a wide reputation, and he was a consulting engineer in the execution and expansion of similar works at New York, Boston, and numerous other cities. He remained in the service of the city of Philadelphia for forty-two years.

GRAFFENRIED, grä'fen-rēt, CHRISTOPHER, Baron de (?-1735). A Swiss nobleman, who established a colony of Swiss and Germans in North Carolina. In 1709 the Lords Proprietors of Carolina granted to him ten thousand acres on the Neuse and Cape Fear rivers, and soon afterwards a large number of Palatines and Swiss followed him to the confluence of the Trent and Neuse, where they founded a town which they called New Bern in his honor, Bern, Switzerland, having been his birthplace. While he and Lawson, the surveyor-general of the province, were exploring the Neuse River in 1711 they were captured by the Tuscarora Indians, who had become incensed at the encroachments of the colonists, and Lawson was soon put to death, though Graffenried, after many weeks, was allowed to return on condition that no settlements should be made without the sanction of the native chiefs. Graffenried soon afterwards sold his possessions in North America and returned to Switzerland.

GRAFFIGNY, gräf'fē'nyē', FRANÇOISE D'ISSEMBOURG D'HAPPONCOURT DE (1695-1758). A French author, born at Nancy. She was married when young to François Hugues de Graffigny, chamberlain to the Duke of Lorraine, from whom she obtained a separation. In 1738 she spent an unhappy few months with Madame du Châtelet, the friend of Voltaire, where she was accused of having stolen a copy of *La Pucelle*. She published her first novel in 1740, but it was not until her *Lettres d'une Péruvienne* (1747) appeared that she became famous in the society of her time. Her salon was a literary centre of Paris. In 1750 her drama *Cénie* was played with great success, but another comedy, *La fille d'Aristide* (1758), failed completely, and this, says the Abbé de Voisenou, hastened her death. Her complete works were published in 1788, and her letters, under the title *Vie privée de Voltaire et de Madame du Châtelet*, in 1820 (reëdited with a biography, 1879). Consult Guerle, *Madame de Graffigny* (Nancy, 1882).

GRAFFITI, gräf-fē'tē (It., scribblings). An interesting and important class of ancient inscriptions. The graffito is a rude scribbling or scratching on the plaster of a wall, a pillar, or a door-post. Such scribblings are pretty commonly found on the substructions of Roman ruins, as in the golden house of Nero, and the palace of the Cæsars on the Palatine, and in still greater numbers in Pompeii and in the Roman catacombs. Their literary value, of course, is very slight; but as illustrating the character and habits of a certain class of the ancient Romans, and what may be called the 'street life' of the classic period, they are deserving of study. They are also valuable for the light they throw on the forms of the alphabet in daily use, and the vulgarisms and corruptions existing in the speech of the common people. The graffiti of Pompeii are far the most numerous and important, forming upward of one-half the inscriptions from that place. A few are in Greek, many in Oscan, but most of them are Latin. They include nominations to office, advertisements, caricatures, single names, words of greeting or abuse; but the favorite subject of the scribblers was love, sometimes in verse quoted, adapted, or original. Of the Roman graffiti, the most famous is the one found on the Palatine, showing a man worshiping a cross on which is suspended a figure with the head of an ass; a Greek inscription says it is Alexamenus worshiping his god. Consult: Lanciani, *Ancient Rome* (Boston, 1887), and Wünsch, *Sethianische Verfluchungstafeln* (Leipzig, 1898). The interpretation of the scene as a parody of the Crucifixion is by no means certain; it is very possibly the confession of Alexamenus of his membership in the Gnostic sect which worshiped Typhon-Set. The graffiti of Pompeii are collected by Garucci, in *Graffiti de Pompéi* (2d ed., Paris, 1856). Consult also Fiorelli, *Monumenta Epigraphica Pompeiana I.* (Naples, 1854-56; 2d ed., giving the Oscan inscriptions, 1856); *Corpus Inscriptionum Latinarum*, vol. iv. (Berlin, 1871; supplement in preparation). The later discoveries are scattered through periodicals, or uncollected. For Rome, consult Correra, "Graffiti di Roma," in *Bollettino della commissione municipale archeologica* (Rome, 1893 et seq.).

GRÄFLE, gräf'le, ALBERT (1809-89). A German historical, genre, and portrait painter, born at Freiburg, where he studied philosophy at the university. In 1827 he went to Munich and became pupil of Cornelius and Schnorr at the academy, and from 1840 studied under Winterhalter in Paris, where he was awarded a gold medal in 1846. After traveling in France and England, he settled in Munich in 1852. Besides the "Triumph of Arminius" (Karlsruhe Gallery), and some altarpieces, his more important productions include: "The Seasons and the Divisions of the Day," and "Corpus Christi Procession of Peasant Women" (1860), both in the grand-ducal palace at Karlsruhe; and "Conradin Taking Farewell of his Mother, Elizabeth of Bavaria." He also painted many portraits of royalties (Queen Victoria, etc.), and for Castle Linderhof, Bavaria, a series of twenty celebrities—men and famous beauties—in the time of Louis XIV.

GRAFSTRÖM, gräf'strēm, ANDERS ABRAHAM (1790-1870). A Swedish poet, born at Sundsvall.

His poems won him the special prize from the Swedish Academy in 1817. Many of his songs are very popular, and have been set to music by Nordblom. They were originally published in the journals of the day, but have been collected under the title *Samlade skaldestycken* (1864).

GRAFTING (from OF. *graffe*, a sort of pencil; slip for grafting resembling a pointed pencil in shape, from Lat. *graphium*, from Gk. γραφεῖον, *grapheion*, pencil, graving chisel, from γράφειν, *graphein*, to write). The operation by which the cut surfaces of two branches or roots, either from two different plants or from the same plant, are caused to grow together. The portion used to perpetuate its kind is usually of the present or past season's growth, and is called a scion. The portion into which the scion is inserted is termed the stock, and usually carries roots, or is a part of a root, although in rare cases unrooted cuttings are used as stocks. The art of grafting has been practiced from prehistoric times. Its originator is unknown. The process depends entirely upon the ability of plants to heal wounds. When two wounded (cut) surfaces are so adjusted that the cambium layer of one coincides at any point with the cambium layer of the other, union by granulation of the two surfaces may take place, connection between the conduction vessels of stock and scion becomes established (see CONDUCTION), and new growth begins. The great value of grafting consists in the ease and comparative certainty with which cultural varieties can be increased without serious loss of type characters. Were all forms of the art of grafting to be taken from the horticulturist, commercial tree-fruit growing in its high state of perfection would decay with the orchards existing at the time.

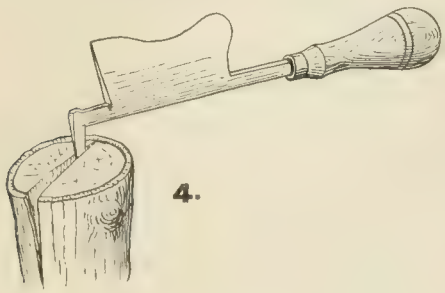
WHIP GRAFTING.
1. Stock. 2. Scion. 3. Stock and scion adjusted.

All horticultural varieties or sorts of fruits that belong to the pome, the drupe, or the citrous classes are now multiplied almost wholly by graftage, which includes both budding and grafting. This art and that of cuttage are the foundations of the entire superstructure of tree-fruit growing. The progress in plant-breeding and the great rapidity with which new sorts are now disseminated has been largely, and with tree-fruits almost wholly, attained by the aid of graftage and cuttage. Graftage permits the originator of a new sort of apples, for instance, to disseminate the variety with the minimum of risk that it will depart from the type, thus avoiding the difficulty, nay, almost impossibility, of reproducing the type from seed. The method of reproducing the sort does not enter as a factor in his efforts to secure a desired variation. Besides the reproduction true to type, grafting is used to hasten or to increase fruitfulness; to replace undesirable varieties by desirable ones; to reduce the size of plants by working them on a smaller growing species of stock, e.g. the pear upon the quince; to overcome the effects of injuries, as in the case of trunk-girdling by mice or rabbits. The wood for scions, like that for hard-wood cuttings, must be taken while in a resting condition. The time usually considered best is after the leaves have fallen, but before severe freezing begins in early winter. The scions are then tied in bunches and buried in moist soil or sand, where they will not freeze, but will be kept cold enough to prevent swelling of the buds. Good results often follow the cutting of scions in the spring, just before or at the time the grafting is to be done.

The two most popular methods of grafting are the whip and the cleft. For *whip grafting* of roots the scions should be cut in the autumn, because spring cutting allows insufficient time for the union of the two surfaces before growth starts. This style of grafting is the one most extensively used in root grafting. It is well suited to young plants or parts of plants used as stock, and to indoor work during the comparative leisure of winter. Both the stock and the scion are cut diagonally and smoothly with a sharp knife, leaving about an inch of cut surface across which, in both stock and scion, a slit is made parallel with the direction of growth, as shown in Figs. 1 and 2. The one object to secure is the juxtaposition of the cambium layers of stock and scion. This may be accomplished by having the bark of the stock coincide with or cross the bark of the scion at a slight angle. After the scion and stock have been joined as in Fig. 3, they should be wrapped with several turns of cotton soaked in grafting wax, in order that the parts may be held firmly together. The root or stock may be left any convenient length, from two and a half to six inches, and the scion cut accordingly. This cutting, however, is usually done before the joining of the two pieces. In general, the shorter the root, the longer the scion, and vice versa. The practices of the more rigorous climates tend to short-piece roots and long scions. The resulting trees, being set deeply, soon send out roots from the scion, and become 'own rooted,' in which case they are believed to be superior to trees that obtain their nourishment solely through the foster roots of a stock. No experiments have been conducted to settle this matter, but common experience is more in favor of the short root deeply set than the reverse. At planting time, root grafts thus made should be covered, only the topmost bud of the scion being left above the soil. If the graft is to be ex-

posed, it should be covered with waxed muslin, or with hard wax. When deeply planted, either in a furrow or with a dibble, the waxed cotton will be ample protection.

Cleft grafting is particularly adapted to large trees, when the variety is to be changed. Branches too large to be worked by other methods may be cleft grafted. But, as a rule, the larger the branch the less satisfactory will be the result. A branch one or one and a half inches in diameter is severed with a sharp saw. The stub is then split with a thin chisel, or with the grafting implement shown in Fig. 4, and held



OPENING SLIT IN SCION WITH GRAFTING-CHISEL.

open with a wedge or the prong of the grafting tool until the scion, shaped as shown in Fig. 5, is inserted, and adjusted, as shown in Fig. 6. The scion should consist of a portion of the

FIG. 5. GRAFTING. FIG. 6. GRAFTING.

previous season's growth of the variety to be propagated, and should be long enough to have two or three buds. In general, it is a good plan to cut the scion so that the basal or proximal bud shall be at the base of the opening of the triangle formed in cutting the scion into the wedge shape necessary in this style of graft. In addition to the advantage of having the proximal bud located as above described, the wedge of the scion should be made thicker on the side to face outward when the scion is in position. The advantage of this is that pressure is brought upon the outer growing parts of both scion and stock, whereas, were the scion thicker on the inner side, the conditions would be reversed, and the death of the scion would follow. The importance of having an intimate connection between the growing tissues of both scion and stock cannot be too strongly emphasized, for upon this alone the success of grafting depends. To make this contact of the growing portions doubly certain, the scion is often set at a slight angle with the stock into which it is inserted, in order to cause the growing portions of the two to cross.

Inarching, or *Grafting by Approach*, is the process of grafting two branches without detaching either from the parent plant. Suitable wounds having been made in both stock and scion, the cut surfaces are brought in contact, fastened and covered with grafting wax or other material to exclude the air. After the tissues have united the stock above and the scion below the point of contact are cut away. This style of grafting is used to correct defects in trees by uniting the arms of Y crotches with a brace of living wood to prevent their splitting apart, twigs from each arm being twisted together and so fastened until they have united. Inarching is also used with herbaceous plants that do not readily unite by other methods. Potted specimens are usually employed in this latter case. The method is the only one found in nature, and is supposed to have suggested all other methods. It is of slight importance in comparison with whip or cleft grafting.

Waxing, which is quite as important as a proper adjustment of the scions, consists in covering all cut or exposed surfaces with grafting wax, grafting clay, or some non-corrosive substance which will exclude air and moisture. The wax may be applied hot, with a brush, but the safest plan is to spread it with the hand while it is warm enough to be worked like taffy. If spread carefully over all cut surfaces and pressed closely, it will form, when cold, a coating impenetrable to air and moisture. In warm climates a soft wax is not desirable for exposed work. It may be used in whip grafting, but in cleft grafting, where all wounded surfaces are exposed to the weather, a hard wax, made by melting together five pounds of resin, two and a half pounds of beeswax, and one-half pound of tallow or one-half pint of linseed oil is preferable. In addition to the two styles of grafting above described, there are several others in common use, most important among which are veneer, saddle, and bud grafting. Some of these operations are used exclusively upon woody plants; others, such as cleft grafting and inarching, are adapted to herbaceous plants. All have a place in practical horticulture. Consult: Bailey, *The Nursery Book* (New York, 1896); id., *Cyclopedia of American Horticulture* (New York, 1900-02); Fuller, *Propagation of Plants* (New York, 1894). See BUDDING.

GRAF'TON. A city and river port of Clarence County, New South Wales, Australia, situated on both sides of the Clarence River, which is navigable for moderate sized vessels to the sea, 45 miles distant (Map: New South Wales, G 1). It is the terminus of a branch railway from Brisbane, 150 miles to the north; is a thriving agricultural centre, and has coal, gold, silver, and copper-mining industries. Population, in 1901, 4174.

GRAFTON. A town, including several villages, in Worcester County, Mass., six miles southeast of Worcester; on the Boston and Albany and the New York, New Haven and Hartford railroads (Map: Massachusetts, D 3). It has a public library, and manufactures cotton goods, shoes, emery, thread, and boxes. A settlement of 'praying Indians' was established here in 1660 by John Eliot; in 1728 white settlers came; and in 1735 the town of Grafton was incorporated. The government is administered by annual town meetings. Population, in 1890, 5002; in 1900, 4869. Consult Pierce, *History of Grafton* (Worcester, 1879).

GRAFTON. A city and the county-seat of Walsh County, N. D., 40 miles north by west of Grand Forks; on the Park River, and on the Northern Pacific and the Great Northern railroads (Map: North Dakota, H 1). The centre of a productive wheat region, it has several grain-elevators, flour-mills, a creamery, machine-shops, etc. The State Institute for the Feeble-Minded is here. Population, in 1890, 1594; in 1900, 2378.

GRAFTON. A city and the county-seat of Taylor County, W. Va., 100 miles southeast of Wheeling; on the Tygart Valley River, and on the Baltimore and Ohio Railroad (Map: West Virginia, E 2). There is a national cemetery here with 1261 graves, 620 of unknown dead; and the State Reform School is four miles to the west, at Pruntytown. The city is an important railroad town, the terminus of four divisions of the Baltimore and Ohio Railroad, and has railroad machine-shops, flour and planing mills, cigar-factories, a wooden-pump factory, and wholesale grocery and drug houses. Grafton dates from 1854, its origin being due to its establishment as a railroad centre; it was first incorporated in 1856, and in 1899 received a city charter. The government is vested in a mayor, annually elected, and a city council. There are municipal water-works and an electric-light plant. Population, in 1890, 3159; in 1900, 5650.

GRAFTON, Augustus Henry Fitzroy, Duke of (1735-1811). An English statesman. He was educated at Westminster School and, under Stonehewer, Gray's friend, at Peterhouse, Cambridge. In 1756 he was elected to Parliament, and in the following year succeeded his grandfather as Duke, and was made Lord Lieutenant of Suffolk. Seven years later Bute dismissed him from his post, and Grafton, allying himself with Lord Temple, attacked Bute sharply. In 1765 he was made Secretary of State for the Northern Department, under Rockingham; but retired in the following year, and forced the resignation of his colleagues, and the formation of a new Ministry under Pitt, in which Grafton became head of the Treasury. But Pitt retired in 1768, and Grafton became actual head, where he had been first only in name. In 1770 he resigned, urged by a difference with his old friend Pitt. A year later he became Lord Privy Seal in North's Cabinet in the hope, if we are to believe his own account, of bringing the quarrel with the Colonies to a peaceable end. He retired from this office in 1775 to enter it again in 1782, but left public life on the downfall of the Rockingham Ministry in 1783. He was estranged from orthodox beliefs; became a Unitarian, and wrote: *Hints Submitted to the Serious Attention of the Clergy* (1789), and *The Serious Reflections of a Rational Christian from 1788 to 1797* (1797). He refused the degree of LL.D. from Cambridge, because it entailed subscription to the Thirty-nine Articles. His *Memoirs* have not been printed entire; excerpts are included in Campbell's *Lives of the Chancellors*, Stanhope's *History*, and Walpole's *Memoirs of George III.*

GRAFTON, Henry Fitzroy, Duke of (1663-90). An English sailor, second son of Charles II. and Lady Castlemaine. At the age of nine he was married to Isabella Bennett, five years old, and the heiress of the Earldom of Arlington. In the same year he was made Earl of Euston, and three years afterwards became Duke of Grafton. He entered the navy in 1680; was captain of the *Grafton* in 1683; and campaigned with the French at the siege of Luxemburg. He was Lord High Constable at the coronation of James; served against Monmouth; and escorted D'Adda, the Papal nuncio, on his entry to London; but later grew disaffected toward his uncle, and was suspected of conspiring with Churchill (the future Duke of Marlborough) against him. He joined William at Axminster, and was one of the first to take the oath of allegiance to him. Subsequently he took service with Churchill in Ireland, and was killed while leading the attack on Cork. He was a typical sailor, and was greatly loved and lamented. He was succeeded by his son Charles (1683-1757).

GRAFTON, Richard (c.1500-c.1572). An English printer and chronicler. With Edward Whitechurch, Grafton had a revision of Coverdale's Bible, under the editorship of Thomas Matthews, printed, probably at Antwerp, in 1537, and again in 1538 at Paris. The latter is the first book with Grafton's name. He was connected with Whitechurch in the printing of the Great Bible in France and in England (1539 and 1540), and of a New Testament in English from Erasmus's Greek text (1540). Two years later *The Order of the Great Turcke's Court* and Erasmus's *Apophthegms* appeared from Grafton's press; in 1544 he received a patent for printing liturgies, in 1545 a monopoly for printing Latin and English primers; and became printer to Prince Edward both before and after his accession, printing the first edition of the *Book of Common Prayer* (1549). Printer for Lady Jane Grey, he lost office under Queen Mary, but sat in Parliament in 1553, 1556, and 1562. As a chronicler, he first revised and printed Hardyng's *Chronicle* (1543); later (1548) he printed Hall's *Union of the Two Noble and Illustrious Families of Lancastre and Yorke;* and after he had retired from business wrote an *Abridgement of the Chronicles of England* (1562), and *Chronicle at large and meere Historye of the Affaires of Englande* (1568).

GRAGAS, grä'gâs (Icel., gray goose). A name given to several private collections of Icelandic law and legend under the Commonwealth, and suggested by the similar epithet, *Gullfjödhr* (gold-feather), applied to the old Norwegian code. The *Gragas* are principally made up of the *Konungsbok* and the *Stadharholsbok*, the first of which has been ascribed to the eleventh century historian Ari.

GRAGNANO, grâ-nyä'nô. A city in the Province of Naples, Italy, three miles inland from Castellamare (Map: Italy, J 7). It is well

known for red wine and macaroni. Population of commune, in 1881, 13,902; in 1901, 14,099.

GRAHAM, grā'am, Charles Kinnaird (1824-89). An American civil engineer and soldier. He was born in New York City, entered the United States Navy as a midshipman in 1841, and served in the Mexican War. In 1848 he retired for a time to study engineering, and was for several years after 1857 constructing engineer of the Brooklyn Navy Yard. The dry dock and landing ways of that establishment were constructed under his supervision. At the outbreak of the Civil War he entered the Army of the Potomac as major of the so-called 'Excelsior Brigade,' and in November, 1862, he was raised from the rank of colonel to that of brigadier-general. He was severely wounded in the battle of Gettysburg, and upon his recovery was assigned by General Butler to the command of a gunboat flotilla on the James River. In March, 1865, he was brevetted major-general of volunteers. After the close of the war he returned to New York, and resumed the practice of his profession. From 1878 to 1883 he was Surveyor of the Port in New York.

GRAHAM, Douglas (1724-79). The dwarf chap-book writer and bellman of Glasgow, born at Raploch, near Stirling. He joined Prince Charles's army as sutler, and was present at the battle of Culloden, of which he published "a full particular and true account" in a kind of doggerel five months afterwards. About 1770 he became the bellman or town crier of Glasgow. His chap-books, often published anonymously, are very rare, and were very popular. They are not in any sense literary, but have a certain coarse humor, and are interesting as a chronicle of the common events of the town. A complete edition of his writings, with a biographical introduction, was edited by George MacGregor (1883).

GRAHAM, George Rex (1813-94). An American journalist, born in Philadelphia. In 1832 he apprenticed himself to a cabinet-maker in that city. While working at this business, he studied law, and in 1839 was admitted to the bar. He had also found time to write a series of articles for the Philadelphia papers, and these led to his becoming editor of the *Saturday Evening Post.* Afterwards he became editor of *Atkinson's Casket, Graham's Magazine,* and the *Philadelphia North American,* in all of which he was financially interested. Unfortunate stock speculations swept away most of his fortune, however, and he was compelled to support himself by writing until in 1887 cataracts on both eyes forced him to retire. He was operated on successfully, but from that time until his death did no active work.

GRAHAM, Sir Gerald (1831-99). An English soldier. He was born at Acton, Middlesex, and after a course at Wimbledon, visited Dresden, and upon his return was admitted to the Royal Military Academy, Woolwich. He served in the Crimean War, participating in the battle of the Alma, at Inkerman, and in the siege of Sebastopol, where, by his intrepidity, he became the central figure in the assault on the Redan, June 18, 1855. During the campaign in China, he again displayed great courage and skill, and although seriously wounded in the storming of the Taku forts (August 21, 1860), subsequently entered Peking with the victors. After acting as commander of the engineering corps at Brighton and Aldershot, he held the same position at Montreal (1866-69). In 1882 he accompanied Sir Garnet Wolseley to Egypt as brigadier-general, and his forces had a great share in the victorious campaign against Arabi Pasha. In 1884 he took the field against Osman Digna, whose army he defeated at Tokar and Tamanieb. In the meantime he had urged a plan for the assistance of Gordon, which, however, was not accepted. He published a number of scientific papers, and a contribution to the *Fortnightly Review,* entitled "Last Words with Gordon" (1887), and prepared a translation of Goetze's *Operations of the German Engineers and Technical Troops During the Franco-German War of 1870-71* (1875).

GRAHAM, Isabella Marshall (1742-1814). An American philanthropist, born in Lanarkshire, Scotland. She married John Graham, a British army surgeon, in 1765, and after his death at Antigua in 1774, returned to Scotland and taught a number of years. In 1789 she came to New York, and opened a girls' school. The philanthropic work she had begun in her own country was there continued on a larger scale. She organized a number of charitable societies, and the first Sunday school for ignorant adults. Consult Mason, *Memoir of Isabella Graham* (New York, 1816).

GRAHAM, James. Fifth Earl and first Marquis of Montrose. See Montrose.

GRAHAM, James Duncan (1799-1865). An American soldier and engineer, born in Prince William County, Va., and educated at West Point. He entered the army as third lieutenant of artillery, and served as adjutant at the Military Academy until 1819, when he went with Major Long on his trip through the West. After seven years' service in the topographical department, he was assistant topographical engineer (1829-38); then was promoted to be major, and appointed to settle the line between Mexico and the United States. He surveyed the northeastern boundary, and was principal astronomer on the commission to fix the northwestern boundary. He became colonel of engineers in 1863, and spent his last years in coast survey.

GRAHAM, Sir James Robert George (1792-1861). An English statesman. The eldest son of Sir James, the first baronet, and of Lady Catharine Stewart, eldest daughter of John, seventh Earl of Galloway. He was born at Netherby, Cumberland, June 1, 1792. He was educated at Westminster School, and in 1810 entered Christ Church, Oxford. At twenty-one years of age he became private secretary to Lord Montgomerie, the British Minister to Sicily, and the entire management of the mission devolved upon him during the most critical period of the war, in consequence of the illness of his chief. On the arrival of Lord William Bentinck, he retained his position, and afterwards accepted a military situation attached to the person of Lord William, who was Commander-in-Chief in the Mediterranean. In this capacity at Naples he negotiated the armistice with Murat which separated that general from Napoleon. In 1818 he was returned for Hull on Whig principles; but in 1820 lost his seat. In 1824 he succeeded to the baronetcy on the death of his father. In 1826 he was returned for Carlisle as a Whig, and a warm supporter of Catholic emancipation. In 1830 he be-

came First Lord of the Admiralty, with a seat in the Cabinet, and was one of the committee appointed to discuss and settle the provisions of the first Reform Bill. In 1834 he seceded from the Government with Mr. Stanley, on the appropriation clause of the Irish Church Temporalities Act. In 1838 he was elected lord rector of the University of Glasgow. In 1841 he became Secretary of State for the Home Department in the Government of Sir Robert Peel, who on one occasion declared that Graham was the ablest administrator and the best man of business he had ever known. In 1844 a warrant issued for opening the letters of Mazzini, and the communication of their contents to the Austrian Minister involved Graham in great obloquy. He also incurred displeasure by his high-handed dealing with the Scottish Church troubles which ended in the formation of the Free Church. He gave Peel warm support in carrying the Corn Law Repeal Bill, and resigned office with his chief as soon as that measure was carried. On the death of Peel in 1850 he became leader of the Peelite Party in the Lower House, and led the opposition to the Ecclesiastical Bill. From December, 1852, he held his old office of First Lord of the Admiralty in the coalition Ministry of the Earl of Aberdeen, until his retirement in February, 1855. He died from heart disease, October 25, 1861. His commanding stature, fine personal presence, ripe wisdom, and calm and impressive eloquence made him the Nestor of the House of Commons. But his changes of opinion, from the Whiggism of his youth to the Conservatism of his manhood, and the Radicalism of his old age, exposed him to well-founded charges of political inconsistency. For his life, consult: Torrens (London, 1863); and Lonsdale in *The Worthies of Cumberland,* vol. ii. (London, 1867-75).

GRAHAM, John, Viscount Dundee (c.1649-89), oftenest spoken of as Claverhouse. The eldest son of Sir William Graham of Claverhouse, head of the branch of the noble family of Montrose, in Forfarshire. He entered Saint Andrews University in 1665, served in the French Army from 1668 till 1672, after which he entered the Dutch service as cornet in the Prince of Orange's horse guards. Returning to Scotland, he obtained (1678) an appointment as lieutenant in a troop of horse commanded by his cousin, the third Marquis of Montrose. At this time the Government of Charles II. was engaged in an attempt to force Episcopacy upon the people of Scotland. A system of fines and military coercion had been carried on for years against all nonconformists; conventicles and field-preachings were prohibited, and penalties were inflicted on all who harbored the recusants. When the people resisted this oppression, many were put to death, the jail was filled with captives, and those who fled were outlawed, and their property was seized. It was now Graham's duty to repress the Covenanters in the south of Scotland. In this work he was continually baffled, and was even put to flight by a body of armed Covenanters at Drumclog. Finally, however, as commander of the cavalry, he aided the Duke of Monmouth in defeating them at Bothwell Bridge, June, 1679. The victors killed 400 rebels and captured 1200, who were afterwards treated with atrocious cruelty. In these encounters Graham showed no marked ability; but in pursuing, detecting, and hunting down unyielding Covenanters he evinced the utmost zeal. He rose to the rank of major-general, was sworn a Private Councilor, and in 1688, on the eve of the Revolution, James II. raised him to the peerage as Viscount Dundee and Lord Graham of Claverhouse. After this monarch had fallen, Dundee remained faithful to him. Joined by the Jacobite Highland clans, and by auxiliaries from Ireland, he raised the standard of rebellion against the Government of William and Mary. With 2500 foot and a troop of horse he defeated General Mackay at the Pass of Killiecrankie, July 27, 1689. Dundee fell by a musket-shot while waving on one of his battalions to advance. He was carried off the field to Urrard House, or Blair Castle, and there expired.

The character and services of Dundee have been greatly exaggerated and blackened by party spirit. With the Jacobites he was the brave and handsome Cavalier, the last of the great Scots and gallant Grahams. He was upright and virtuous in private life, and in military discipline remarkably severe. With the Covenanters, he was "wicked-witted, bloodthirsty Claver'se." As a military commander, he had little opportunity for display, yet the battle of Killiecrankie was skillfully planned, and fought with courage and dash. As a persecutor he was severe, but not wholly without pity. Consult: Graham, *Letters with Illustrative Documents,* edited by Smythe (Edinburgh, 1526); Napier, *Memorials and Letters Illustrative of the Life and Times of John Graham of Claverhouse* (Edinburgh, 1859-62); A Southern (pseud.), *Clavers, the Despot's Champion: A Scot's Biography* (London, 1889); Morris, "Claverhouse," in Lang, *English Worthies* (London, 1887); *Acta Parl. Scot. IX.* (appendix); Macaulay, *History of England* (New York, 1858); Burton, *History of Scotland* (Edinburgh, 1867-70). Scott's novel *Old Mortality* gives a spirited picture of Claverhouse.

GRAHAM, John (1754-1817). A Scotch painter, born in Edinburgh. He studied at the Royal Academy, London. He was master of the Trustees' Academy in Edinburgh from 1798 until his death, and an excellent teacher. Among his well-known pupils were Allan, Wilkie, Burnett, and Gordon. He was most successful as a figure painter, though he also painted portraits and animal studies.

GRAHAM, Peter (1836—). An English landscape and animal painter, born in Edinburgh. He studied at the Edinburgh School of Design under Lauder and Ballantyne; afterwards he removed to London and became an R.A. in 1881. He is noted for his spirited studies of Highland scenery with cattle, such as "Highland Spate" (1866), and "Moorland Rovers," and for finely rendered sea pictures, distinguished for atmospheric effect and sincerity of treatment. These include "Our Northern Wall," "The Fowler's Crag," and "Where Deep Seas Moan."

GRAHAM, Richard, Viscount Preston (1648-95). See Preston.

GRAHAM, Sylvester (1794-1851). An American reformer, best known as a temperance lecturer and an advocate of vegetarianism. He was born at Suffield, Conn., studied at Amherst, and about 1826 entered the ministry of the Presbyterian Church. A few years later he became a temperance advocate, and based his cure for

alcoholism upon proposed radical reforms in diet, his theory being that a vegetable diet is incompatible with a craving for stimulants. In particular, therefore, he urged an entire abstinence from meat, and an improvement in the making of bread. Graham bread has become a settled name for the article made of unbolted wheat flour, and strongly recommended by him. He published: *Graham Lectures on the Science of Human Life* (1839); *Bread and Bread-Making*; *A Lecture to Young Men on Chastity*; and part of a projected work on *The Philosophy of Sacred History*.

GRAHAM, Thomas. See Lynedoch, Thomas Graham, Lord.

GRAHAM, Thomas (1805-69). An English chemist, born in Glasgow. Having studied at Glasgow and Edinburgh, he became, in 1830, professor of chemistry at the Andersonian University, and continued in that office till 1837, when he succeeded Dr. Turner in the chemical chair of University College, London. In 1855 he was appointed master of the mint, and resigned his professorship. Graham is best known for his researches on the diffusion of gases and of substances in solution. His experiments, carried out with the aid of very simple apparatus, furnished valuable data, which have proved of great importance in the development of the modern theory of solutions. In studying solutions, he found that the velocity of diffusion varies with the substance in solution, and depends to a great extent on the temperature at which the liquid is kept. He found that amorphous substances like albumen, gum arabic, silicic acid, ferric hydroxide, etc., which he designated by the term *colloids*, diffuse very slowly, and are incapable of passing through parchment paper or animal membranes, while substances like sugar, the mineral acids and their salts, etc., which he termed *crystalloids*, diffuse more or less rapidly and pass freely through membranes. He was thus led to the discovery of the analytical method known as *dialysis*. To separate by this method a crystalloid from a colloid, the solution containing both is placed in a suitable vessel, and is separated from a volume of pure water usually by parchment paper. Part of the crystalloid then passes out of the solution into the pure water, while the colloid is stopped by the membrane. If the water, now containing some of the crystalloid, is replaced by a new quantity of pure water, some more of the crystalloid diffuses out of the solution containing the mixture. By repeating the operation several times, a solution is finally obtained which contains practically nothing but the pure colloid. Graham carried out numerous other classical researches in chemistry, including investigations of the acids of phosphorus, the constitution of sulphates and oxalates, etc. His researches were published in the form of original memoirs, comprising in all sixty-three papers on various subjects. In addition to these memoirs, he brought out an excellent treatise on chemistry, which has passed through several editions, and was republished in this country and translated into German. He also edited the *Chemical Reports* and *Memoirs* of the Cavendish Society in 1848. Graham was the first president of the Chemical and the Cavendish societies, was a fellow of the Royal Society, and an honorary member of many foreign scientific bodies. He was likewise frequently placed by the British Government on important scientific commissions. See Diffusion; Colloids; Chemistry.

GRAHAM, William Alexander (1804-75). An American politician. He was born in Lincoln County, N. C.; graduated at the University of North Carolina in 1824; was admitted to the bar soon afterwards, and for several years after 1833 was a member of the State Legislature, serving for part of the time as Speaker of the Lower House. He served three years in the United States Senate, and was elected Governor of his State by the Whigs in 1845, and again in 1847. Under President Fillmore he was Secretary of the Navy from 1850 until June, 1852, and as such organized Commodore Perry's expedition to Japan. When General Scott ran for President in 1852, Graham was on the ticket as candidate for Vice-President. In 1865 he was a member of the Confederate Senate.

GRAHAM BREAD. See Bread.

GRAHAME, grām, James (1790-1842). A Scotch historian. He was born at Glasgow; was educated at Saint John's, Cambridge; practiced law for some years; and then devoted his time to the preparation of his *History of the Rise and Progress of the United States of North America* (to 1776) (4 vols., 1836). The work passed through several editions (the edition of 1845 containing a *Memoir* by Josiah Quincy), and was pronounced by Prescott to be the best work before Bancroft's. Bancroft's criticisms of Grahame were answered by Quincy in a pamphlet published in 1846, *The Memory of the Late James Grahame Vindicated from the Charges of Mr. Bancroft* (Boston, 1846). Grahame also denounced slavery in *Who is to Blame? or Cursory Review of the American Apology for American Accession to Negro Slavery* (1842).

GRAHAME, James (1765-1811). A Scottish poet. He was born in Glasgow, was educated at the university of that city, and removed to Edinburgh in 1784, where he studied and practiced law. Finding the legal profession unsuited to his tastes, he afterwards took orders in the Church of England, and was successively curate of Shipton, in Gloucestershire, and of Sedgefield, in the County of Durham. He left several poetic works, the chief of which is *The Sabbath* (1804), a poem admired by Scott for its feeling for nature, and scoffed at by Byron in his *English Bards and Scotch Reviewers*. Grahame also published: *Poems on the Abolition of the Slave Trade* (1804), and a pamphlet, *The Birds of Scotland* (1806).

GRAHAM-GIL'BERT, John (1794-1866). A Scotch painter, born at Glasgow, son of a West Indian merchant. He went into business at his father's command, but soon left it to devote himself to art; went to London (1818); studied in the Royal Academy schools; and won a silver medal in 1819 and a gold medal in 1820. He became a portrait painter, and exhibited at the Royal Academy (1820-23). He then spent several years in Italy, but had returned to Scotland in 1827. In 1829 he became an Academician. Five years later he married a Miss Gilbert, and assumed her name. In 1864 he was defeated for the presidency of the Scottish Academy by a single vote. He painted portraits of Sir John Watson Gordon (1856), John Gibson (1848), Sir Walter Scott

(1829), and John Burns (1857). His other works include: "The Pear Tree Well" (1844); "Females at the Fountain" (1845); "The Young Mother" (1853); "A Roman Girl" (1864); "An Italian Nobleman;" "The Bandit's Bride;" "The Beggar Maid;" "The First Born;" "Crossing the Ford;" "Going to Market;" "La Penserosa;" and the biblical pictures, "Prodigal Son" (1819); "Christ in the Garden" (1848); "Christ Appearing to Mary Magdalene;" and "Christ and the Woman of Samaria."

GRAHAMITE, grā′*a*m-īt (named in honor of J. Lorimer Graham of New York, and Colonel Graham of Baltimore). An asphaltic coal originally found in Wood and Ritchie counties, W. Va., where it occupies more or less vertical veins or fissures that traverse rocks of Coal Measure age. A peculiarity of this deposit is that the grahamite fractures in such manner as to form columns, the axes of which are at right angles to the walls of the vein. It has also been found in Colorado, Texas, and Mexico. Its origin is supposed to have been through oxidization of petroleum. It is used for making varnishes and insulators. See ASPHALTIC COAL.

GRAHAM LAND. Part of the western coast line of that portion of the so-called Antarctic Continent which lies to the southward of South America. It extends in a northeast direction from near Alexander Island (latitude c. 68° 43′ S., longitude c. 72° W.) about two degrees of latitude; its limits are not definitely determined. Its existence was vaguely reported by the American sealers, who visited the region in the second decade of the nineteenth century, and in 1832 John Biscoe, the master of a British sealer, brought home a more definite report, and the discovery of the territory has usually been credited to him.

The name Graham Land has also been used to designate all of what is supposed to be a spur of the Antarctic mainland, jutting out toward South America. What is known of this region is included, roughly speaking, between the fifty-sixth and fifty-seventh meridians of west longitude and the sixty-fifth and sixty-ninth parallels of south latitude. To that portion of this territory which has been seen by various explorers, various names have been given. The Norwegian sealer Larsen discovered the east coast in 1894, and named the northern portion of it King Oscar II. Land, and the southern portion, which he saw in the distance, Foyn Land. His most southern point is latitude 68° 10′ S. The Belgian Antarctic expedition of 1897-99 discovered what they believed to be the northern terminus of the mainland, and named it Danco Land. The Swedish expedition under the command of Otto Nordenskjöld visited Graham Land in 1901. In no case has any explorer penetrated into the interior, and it is not certain that the region is not an archipelago instead of a solid land mass. See ANTARCTIC REGION.

GRAHAM'S DYKE. A popular name in England for the remains of the Roman wall in the south of Scotland. See ROMAN WALL.

GRAHAMSTOWN, grā′*a*mz-toun. See THAMES.

GRAHAMSTOWN. The capital of the division of Albany, in Cape Colony, situated a short distance from the coast, and connected by rail with Kimberley, Port Elizabeth, and Port Alfred (Map: Cape Colony, K 9). There are some manufactures of tweed and blankets. Population, in 1891, 10,498.

GRAIL, grāl, THE HOLY (from OF. *graal, greal*, from ML. *cratella*, bowl). The spelling varies greatly in the old manuscripts, but in modern usage the most common English forms are *grail* and *graal*. The Grail had a history, which in the fully developed romance ran somewhat in this wise: It was the dish from which Christ ate at the Last Supper. Joseph of Arimathea, wishing to preserve something which belonged to Christ, took it from the table, and afterwards collected in it the blood from the body of Christ, either while the body was on the cross or after it had been taken down. The vessel was brought to England by Josephes, a son of Joseph, or by Brons, Joseph's brother-in-law. It was handed down from generation to generation. It possessed many mystic properties—feeding those that were, like Joseph, without sin; multiplying a few loaves of bread, so that they sufficed for five hundred people; blinding from its effulgence all, except the pure, who looked upon it, or striking dumb those who came into its presence. It was also identified with the cup of the Last Supper, and more or less vaguely with Christ Himself. The Grail first appeared in romance united with the story of Perceval. Living with his mother in seclusion far from the Court, the boy Perceval is kept in ignorance of chivalry. One day he meets by chance several knights, and is fascinated by the splendor of their armor, taking them for angels. Setting out as knight-errant, he comes to the castle of the Fisher King, who lies speechless. Before the King passes a bleeding spear and a sacred vessel, concerning which Perceval fails to ask questions. Had he, a pure man, spoken, the King would have been healed. After many wanderings, Perceval returns to the Grail castle, welds together a broken sword, and becomes King. The story is worked out with many details, which often differ from those here given. Later the legend assumed a very different form. It was connected with the Arthurian cycle, and Galahad was given the leading rôle in the quest. Many knights from Arthur's Court go on the adventure; but the Grail is seen only by Galahad, Perceval, and Bors, who follow it to the far East. Galahad's soul is borne up to heaven by a great multitude of angels, Perceval dies in a hermitage, and Bors returns to Britain.

Though there are many unsolved problems connected with the growth of the Grail legend, its development seems to have been somewhat as follows: Chrestien de Troyes, a French trouvère (died about 1195), left incomplete a poem known as "Perceval," or "Le Conte del Graal," which was continued by other hands. On this romance, Wolfram von Eschenbach, a poet of South Germany, founded his *Parzival* (about 1210), the finest poem on the legend. According to this version, the Grail is a precious stone which came from heaven after the fall of the angels. It is guarded by a chaste order of knights whom it chooses. Other early Grail romances are a trilogy by the French poet Robert de Borron, known as "Joseph d'Arimathie;" "Merlin;" "Perceval" (early in the thirteenth century), in which the Grail legend is attached to the Arthurian cycle; *Queste del Saint Graal* (about 1210), a prose romance, in which Perceval is displaced by

Galahad, who is thought to be a son of Lancelot; *Grand Saint Graal* (about 1230), also in prose; the prose *Perceval le Gallois* (about 1225); the *Mabinogi of Peredur* (i.e. Perceval), a Welsh prose romance (in the fourteenth century); and "Sir Perceval of Galles," an English poem (about 1440). Of the second poem, by Borron, only fragments are extant; and the third, in its original form, is lost, though its matter may be inferred from the prose romance known as the *Didot Perceval* (second quarter of the thirteenth century). Sir Thomas Malory embodied the *Quest*, of which Galahad is the hero, in his *Morte d'Arthur*, printed by Caxton in 1485. From this brief summary the Grail legend is seen to be the work mostly of French poets in the twelfth and thirteenth centuries. On what did they build? It is generally held that much of the matter—for example, the hero and the magic vessel—was originally Celtic. Of this there is no reasonable doubt. And yet the precise nature of this Celtic contribution to the legend has not yet been determined. The romance of the Grail, so popular in the Middle Ages, was revived by the poets of the nineteenth century. Best known is Tennyson's poem in the *Idylls of the King*. Tennyson, following Malory, gives the Galahad version, and of course infuses into the legend modern ideas. On the other version Wagner founded the great music drama of *Parsifal*. Consult: Paris, *La littérature française au moyen âge* (2d ed., Paris, 1890); Hucher, *Le Saint Graal* (Paris, 1875-79); Birch-Hirschfeld, *Die Sage vom Gral* (Leipzig, 1877), Hagen, *Der Gral* (Strassburg, 1900); Nutt, *Studies on the Legend of the Holy Grail* (London, 1888); Rhŷs, *Studies in the Arthurian Legend* (London, 1891); Heinzel, *Ueber die französischen Gral-Romane* (Vienna, 1891); Newell, *King Arthur and the Table Round* (Boston, 1897). See GALAHAD and PERCEVAL.

GRAIN. See CARYOPSIS; FRUIT.

GRAIN (OF. *grain, grein*, Fr. *grain*, from Lat. *granum*, grain, ultimately connected with Eng. *corn*). A measure of weight. See WEIGHTS AND MEASURES.

GRAIN ELEVATOR. A structure for the handling, storage, or cleaning of grain during, or preparatory to, its trans-shipment from railway cars to vessels, and vice versa. In exterior appearance the modern grain elevator is a windowless rectangular structure, surmounted by a cupola-like superstructure. The main body of the building, called the 'house,' is mostly occupied with bins for the storage of grain, while the surmounting structure, which is generally three stories high and is called a cupola, contains the operating machinery and working rooms. Generally the topmost story of the cupola contains the leg-driving machinery and turnhead spouts, the middle story the garners, and the lowest story the weighing hoppers and cleaning machinery. Below the cupola and main roof, and extending over the entire width and length of the house, is the distributing or spout floor. Here are the conveyors, for transporting lengthwise to the building, and the distributing spouts, for transferring by gravity the grain from the scale hopper to the bins. By means of legs reaching from the bottom of pits sunk below the foundations of the bins to the topmost story of the cupola, and continuing bucket conveyors, the grain is elevated to the turnhead points and discharged into the garners. From these it passes to the lower floor, where it is weighed, cleaned if desired, and finally spouted to its proper bin. This description applies in general to all elevators, but the construction and arrangement of details differ for different classes of elevators. The mode of operation of a grain elevator, described without technicalities, is somewhat as follows: A string of cars is placed so that each car is opposite one of a number of elevator legs located about a car-length apart. The track may enter the building underneath the bins, or may pass along one or both sides of the building. Two shovelers enter each car, and handle each a shovel operated by a rope from a power-shovel shaft in the elevator. These shovels discharge into the hopper or pits into which the feet of the elevator legs descend. From these the bucket conveyors running inside the legs hoist the grain to the topmost story of the cupola, where it is discharged, in turning over a head pulley, into the hopper of the turnhead spouts, thence into the garners, and thence into the weighing hoppers. From the scale hoppers the grain is spouted: (1) Upon belt conveyors running longitudinally across the building and discharging over movable trippers into storage bins (storage elevators); (2) into car spouts, for reloading or transferring (railway transfer elevators); (3) directly into storage bins, which may be (a) shipping bins with dock spouts, to be loaded into vessels; (b) into car spouts (terminal elevators); or (c) into garners above cleaning machinery (cleaning elevators). All of these classes of elevators are designed for taking grain from railway cars and transferring it to vessels or to other railway cars.

Marine elevators, for transferring grain from vessels to railway cars, are provided on the dock side with elevator legs outside of the house, which are mounted on wheels permitting movement along the side of the house and allowing the legs to be set opposite the vessel's hatches. These marine legs convey the grain to the turnhead spouts, whence it passes to the garners, scales, cleaning machinery, if desired, or to the car-loading spouts. There is another class of elevators, comprising small elevators at railway stations for receiving grain from farmers' wagons and transferring it to cars. Floating elevators are structures similar to land elevators, which are mounted on floats or barges, which permit the transportation of the structure from one point of a harbor to another.

In America, the most common construction for elevators is timber, constructed sometimes with thin brick outside protecting walls for the house, and corrugated iron covering for the roof and cupola walls. The purpose of this incombustible outside covering was to decrease the danger from fire, and for this purpose it was evidently superior to unprotected timber construction. This outside protection, however, was of little practical value once fire had gained access to the timber interior, and even with its use insurance rates were very high. As a result, there has been a strong tendency among elevator men in recent years to build fireproof elevators. This construction has usually taken the form of steel bins inclosed by a house with brick walls, and a cupola built entirely of steel framing, covered with terra-cotta or iron, and having tile or sheet-

steel floors. Sometimes the bins are made of concrete, with an imbedded steel skeleton; elevators of this construction have been used more extensively in Europe than in America.

Another type of fireproof elevator construction considerably practiced in America consists in building the storage bins of steel separated from the fireproof buildings containing the operating machinery. A system of pneumatic conveyors for handling the grain between the bins and the operating house, and for loading and unloading it, is an essential part of this type of elevator. As an indication of the character and extent of the elevator business, reference may be made to the records of grain handled by the public elevators of Chicago, Ill. In Illinois the public elevators, like a railway, are compelled to handle all grain submitted to them for storage and transshipment up to the limit of their capacity, and without discrimination, so long as the grain is not diseased or otherwise injured. For this service they are permitted to charge any rate up to a maximum of 1¼ cents per bushel for the first ten days or portion thereof, and of ½ cent per bushel for each ten days afterwards. The total storage capacity of the public elevators of Chicago in 1900 was 31,900,000 bushels of grain at one time, and the capacity of individual elevators ranged from 700,000 bushels to 4,000,000 bushels. These elevators, working together, were capable of unloading 2245 carloads of grain every ten hours. The total amount of grain received into stores by these elevators in 1900 was 72,961,273 bushels.

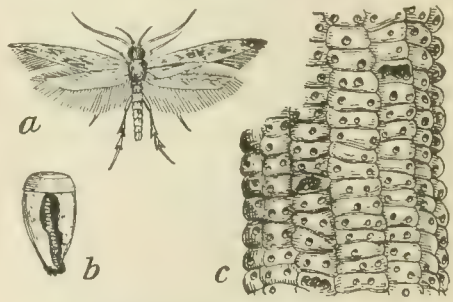
GRAINGER, grān'jēr, JAMES (c.1721-66). An English physician and poet. He was educated at a school in North Berwick, and studied medicine at Edinburgh. After three years of army life (1745-48) he settled in London, but had so little success in medicine that he turned to literature. Besides making a *Translation of the Elegies of Tibullus and of the Poems of Sulpicia* (1759), sharply criticised in Smollett's *Critical Review*, and rendering some assistance in the preparation of Charlotte Lennox's translation of Brumoy's *Théâtre des Grecs* (1759), he wrote, during his travels in the West Indies, a long poem in heroic style on *Sugar Cane*. This was published in 1764, after it had provoked Dr. Johnson's ridicule because of a minute description of rats in the cane-fields. Grainger's collected poems were printed in 1801. Besides a dissertation, *De Modo Excitandi Ptyalismum*, he wrote: *Historia Febris Anomalæ Batavæ annorum 17⁄6*, etc.; *Accedunt Monita Siphylica* (1753); "An Obstinate Case of Dysentery Cured by Lime Water," in *Essays Physical and Literary* (1756), and an *Essay on the More Common West-India Diseases* (1764). He died at Saint Christopher, of West India fever.

GRAINING. A European cyprinoid fish (*Leuciscus Lancastriensis*), of certain streams of the west of England and in some of the lakes of Switzerland. It is rather more slender than the dace; in its habits and food resembles the trout; rises readily at the artificial fly; and affords good sport to the angler. It may reach half a pound in weight, and is excellent eating.

GRAINING (from *grain*, from Icel. *grein*, Swed., Norweg. *gren*, branch; a doublet of *groin*). Fishing with the grain, a sort of pitchfork or spear. There are many varieties of grains, from the five-tine pattern, set crosswise, to the single-tine harpoon of the whaler. In some of its forms, notably that used in the capture of swordfish, the head of the grain remains in the fish after it is struck, attached to a line, but the handle is withdrawn. The most frequently used is one with two prongs, each half barbed inwardly.

GRAIN-INSECTS. Several insects attack and damage stored grain of all sorts. The most conspicuous one is the caterpillar of a small, grayish-brown and black tineid moth (*Gelechia cerealella*), allied to the clothes-moth and called 'corn-moth' in Great Britain, but known in the United States as fly-weevil and Angoumois grain-moth, from the old Province of Angoumois, France, where it has long been extremely destructive. It is most abundant in our Southern States, where, on account of it, grain cannot long be stored. It may at times attack other substances, such as books, pasteboard, woolen goods, or even wood. Salt mixed with the grain is said to be useful in checking the ravages of the larvæ, and the frequent turning over of the grain destroys both eggs and larvæ. When emptied, granaries should be thoroughly cleaned and whitewashed.

A different tineid, also called grain-moth (*Tinea granella*), is another widespread and serious pest, especially to stored wheat; and a third moth (*Ephestia kühinella*), which since 1877 has been a source of vast damage in Europe, appeared in destructive numbers in North America about 1890. It multiplies with amazing rapidity, makes clots in flour or meal, or binds together grains of wheat, Indian corn, etc., by its silk-spinning and voracious caterpillars, and is extremely difficult to get rid of. Another destructive species of the same genus is also known. Consult *Insect Life*, vol. ii. (Washington, 1890).



GRAIN-MOTH AND ITS EFFECTS.

a, adult Angoumois moth (*Gelechia cerealella*); *b*, a kernel of maize, inhabited by a caterpillar; *c*, part of an ear perforated by caterpillars.

Small beetles (weevils) of various kinds attack stored grain, especially those of the genus Calandra. They are minute, numerous, and lay eggs upon the kernels; the larvæ hatched from these bore into and consume the body of the grain, whence they emerge as perfect beetles in the autumn. The most approved remedy is to submit the grain to dry heat of not less than 130° F., or to the fumes of carbon disulphide. See, also, CORN-INSECTS; and for insects attacking growing cereals, see the articles WHEAT INSECTS; RICE INSECTS; etc.

GRAINNE NI-MHAILLE, grä'nyå nē mä'lyå, or GRANAILE (Anglicized, Grace O'Malley). A noted Irish chieftainess and sea queen in the

sixteenth century. She was the daughter of Owen O'Malley, chief of his clan and admiral of the Connacht fleet, and was born in West Galway about 1540. During the Elizabethan wars she took constant and active part against the English and their Anglo-Norman supporters, sallying out from Galway Bay at the head of her fleet to destroy the English shipping or ravage the Norman dependencies along the coast. She was twice married, and seems always to have been the dominant partner. In 1557, while cruising on the coast of Kerry, she was captured by the troops of the Earl of Desmond, by whom she was held prisoner for a year and a half, but on being released at once renewed her forays, and in 1578 defeated a strong expedition sent against her, thus making her name so dreaded that she was permitted to ride through Galway city unmolested. Some years later, her husband dying and her two sons having already been killed, she was induced by a promise of safety to put herself in the power of the English Governor of Galway, by whom she was sentenced to be hanged, but was ransomed by her husband's cousin. In 1591, after several other forays and encounters along the western coast, in one of which she was shipwrecked and forced to remain in hiding for some time, she led a fleet of twenty galleys against some sea rovers from the Hebrides. In 1593, and again two years later, she visited London, and is said to have made submission, but apparently to little purpose, as in 1601 we find record of one of her ships with 100 musketeers being captured by an English sloop of war.

GRAIN-RUST. See RUST.

GRAINS OF PARADISE, or MELEGUETTA PEPPER. An aromatic and extremely hot and pungent seed, imported from Guinea. It is the produce of *Amomum meleguetta*, or *Amomum granum paradisi*, a plant of the order *Zingiberaceæ*, with lanceolate leaves, one-flowered scapes (leafless stems), about three feet high, and ovate or elliptic-oblong capsules containing many seeds. By the natives of Africa these seeds are used as a spice or condiment to season their food; in Europe they are chiefly employed as a medicine in veterinary practice, and fraudulently to increase the pungency of fermented and spirituous liquors. During the reign of George III. brewers and dealers in beer in England were prohibited, under a heavy penalty, from even having the seeds in their possession. The name meleguetta pepper, or Guinea pepper (q.v.), is also given to other pungent seeds from the west of Africa.

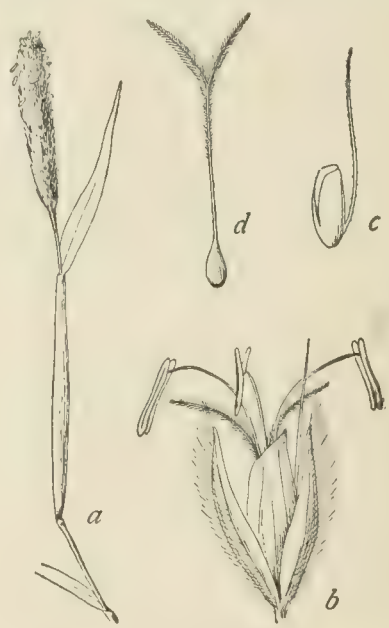
GRAKLE (from Lat. *graculus*, *gracculus*, jackdaw, onomatopoetic in origin). A kind of bird. (1) In America, a blackbird of the genus Quiscalus or the genus Scolecophagus of the family Icteridæ. (See BLACKBIRD.) The best known of those is the purple grakle or 'crow-blackbird' (*Quiscalus quiscula*), which is found throughout the United States as far as Dakota, and thence northwestward to Alaska. It is about 12 inches long, and the male is uniform glossy black with metallic reflections. Larger species are the boat-tail (*Quiscalus major*), and a Mexican species (*Quiscalus macrurus*) is distinguished by having a disproportionately long tail. Well-known species of the other genus are the widely distributed rusty grakle (*Scolecophagus Carolinus*), 9 inches long, the male dead black; and Brewer's (*Scolecophagus cyanocephalus*), of the Rocky Mountain region, which is a uniform glossy, greenish black, the head and neck glossy violet-black. In all species the females and young are gray or brownish, more or less streaked. These birds have all the characteristics described under BLACKBIRD. See Plate of BLACKBIRDS, and Colored Plate of EGGS OF SONG-BIRDS.

(2) In the Old World the name is given to various birds of the starling family (Sturnidæ) and myna family (Eulabetidæ), of the genera Acridotheres, Eulabes, etc. The Linnæan genus 'Gracula' is difficult of definition, and is passing out of use. Most of the Indian birds called 'grakles' are better known as mynas or hill-mynas (q.v.).

GRAM. East Indian name for chick-pea (q.v.).

GRAM (Fr., from Lat. *gramma*, Gk. γράμμα, weight of two obols, writing, from γράφειν, *graphein*, to write). A measure of weight. See METRIC SYSTEM.

GRAMINEÆ, grâ-mĭn′ê-ē (Lat. nom. pl., pertaining to grass, from *gramen*, grass). The great family of grasses, which is one of the largest and probably one of the most useful groups of plants, as well as one of the most peculiar. It is world-wide in its distribution, and is remarkable in its display of individuals, often growing so densely over large areas as to form a compact turf. If the grass-like sedges be associated with the true grasses, there are



ALOPECURUS PRATENSIS.

a, The cylindrical spike; *b*, a single flower with its glumes; *c*, flowering glume with its awn; *d*, the pistil.

about 6000 species, representing nearly one-third of all of the monocotyledons (q.v.). Here belong the various cereals, sugar-canes, bamboos, and pasture grasses, all of them eminently useful plants. They are, for the most part, perennial herbs with profusely branching rootstocks which creep horizontally in the soil and give rise both to sterile shoots in the form of tufts of leaves, and also to fertile shoots. The characteristic leaf of

the group consists of a blade and a prominent sheath, at the junction of which appears the outgrowth called the ligule (q.v.).

The inflorescence of the grasses consists of spikes, racemes, or panicles, and is always composed of an aggregation of secondary inflorescences called spikelets. Each spikelet usually bears several flowers, and also a number of bracts. The two lowest bracts (sometimes three) of each spikelet are sterile, that is, they do not have flowers in their axils, and are known as glumes. Above these are a varying number of bracts subtending flowers, called flowering glumes (formerly outer or inferior paleæ). It is these flowering glumes which are often prolonged into the bristle-like tips known as awns. Opposite each flowering glume on the short flower-stalk there is a bractlet known as the palet (formerly superior or inner palea), which is always awnless. Upon this same short flower-stalk there often appear also two minute scales, known as lodicules, whose morphological character has caused considerable discussion. The flower consists usually of three stamens, each with an oblong or linear anther attached below the middle to the apex of the slender filament (versatile), and a single ovary bearing a style with two, rarely three, stigmatic branches. The various glumes are set so close together upon the axis of the spikelet that they overlap and are only partly visible, completely protecting the flowers. At the time of pollination the glumes separate and the dangling anthers and feathering stigmas become visible. After fertilization the pericarp (ripened ovary wall) adheres so closely to the seed that it seems to be an outer skin, forming the characteristic fruit (the grain) of the group. The embryo is peculiar in that it lies close to one side of the seed, so that it is completely exposed by the splitting of the thin skin which covers it. In this case the single very large seed-leaf, cotyledon, is not unfolded nor removed in germination, but remains as a broad, shield-like absorbing organ, with its back against the starch deposit. This peculiar shield-shaped absorbing cotyledon is called the scutellum.

BROMUS MOLLIS.

The grasses appear in the most varied situations and numbers. Their chief display, however, is in meadows and pastures, where they form the principal vegetation. The meadow grasses occur almost everywhere; the most important of the cereal grasses grow in temperate regions; certain cereals, as rice, etc., are cultivated in the tropics and subtropics; the arborescent grasses, such as the bamboo and its allies, form extensive groves in the tropics, and the small forms grow in the shade of the primitive forest. For fossil forms and forms of economic interest, see GRASSES.

GRAMMAR (OF., Fr. *grammaire*, from Lat. *grammatica*, from Gk. γραμματικη, *grammatikos*, pertaining to writing, from γράμμα, *gramma*, letter, from γράφειν, *graphein*, to write; ultimately connected with Ger. *graben*, Eng. *grave*). That branch of linguistic science which investigates the forms of speech in a language or group of languages and treats of the mutual relations of those forms. Grammar may be divided into normative or didactic, historical, and comparative. Normative grammar deals with the phenomena of a given language at a single period, establishing the linguistic usage for that epoch, any deviation from the standard there set being considered 'bad grammar.' As examples of normative grammar may be cited the ordinary treatises on the Latin of the Ciceronian period, the Attic Greek of the Periclean age, and most grammars of modern French, German, English, and the like. Historical grammar, as its name implies, discusses the historical development of a given language, usually from the earliest traces of the language in question down to the present time. Here no norm is set. The purpose of such a work is merely to present facts, not, as in the normative grammar, to lay down canons of usage. For instance, normative grammar of modern English states that two negatives are equivalent to an affirmative. Such a sentence as 'he didn't hear nothing' as equivalent to 'he heard nothing' is stigmatized as 'bad grammar,' i.e. as deviating from the norm. On the other hand, historical grammar observes that at present two negatives are equal to an affirmative. In Early English, however, as in the Proverbs of Hendyng (thirteenth century), this is not true, for we have such constructions as:

> *Zef þou art riche & wel ytold,*
> *Ne be þou noht þarefore to bold,*
> *Ne wax þou noht to wilde.*
> (If thou art rich and well accounted,
> Be thou not therefore too bold,
> Nor wax thou not too wild.)

In like manner we find in Anglo-Saxon of the best period, as in Alfred's translation of Boëthius, such sentences as *on nānum mǣnn nyton nāne āre* (literally, they don't show no honor to no man, i.e. they show honor to no man). Historically there is no inherent correctness in the use of one negative or more than one. The best usage forms the only law. Historical grammar may, however, explain the origin of a usage, without transcending its limits. Thus in the example before us the double negative is based on a desire for emphasis (if one negative is good, two are better), the use of the single negative, on a sense of logic (one negative annuls another). Comparative grammar, which is usually historical rather than normative in type, groups different languages together for a comparative study of their forms and the relations of such forms. We thus have comparative grammars of Romance, Germanic, Indo-Germanic, Dravidian, or Semitic languages, and the like. Here the discussion will be only of normative and of historical grammar, the subject of comparative grammar being treated under the title PHILOLOGY (q.v.).

HISTORY OF NORMATIVE GRAMMAR. Until the nineteenth century the history of grammar is confined to the normative type. Only with the introduction into Europe of the knowledge of Sanskrit did the impulse come to study language

comparatively and historically. The few attempts made along those lines before had all proved abortive for lack of material and method, and grammarians contented themselves with recording linguistic phenomena of given periods. In the Orient grammatical study began in India with the Nirukta of Yaska (fifth century B.C.), although the first formal grammar of which we have any knowledge was that of Panini (q.v.), probably about B.C. 300. In some three thousand sections comprised in eight books he summarized and fixed the rules for classical Sanskrit. He enumerates sixty-four predecessors, and was himself the forerunner of a long line of grammarians. His rules, which are couched in formulas almost algebraic in type and abounding in arbitrary designations (e.g. *aṭ* = the group of vowels, semivowels, and *h*; *am* = the same group together with the nasals; *lañ* = imperfect tense; *laṭ* = aorist tense; *liṭ* = perfect tense; *luṭ* = periphrastic future, etc., where *l* denotes all personal endings, *ṭ* a primary tense, *ñ* a secondary tense, etc.), formed the basis of many commentaries such as the *Varttikas* of Katyayana (probably third century B.C.), and Patanjali's *Mahabhashya* (probably a half-century later). About the middle of the seventh century A.D. the first complete commentary on Panini was composed, entitled *Kāsika Vrtti*, or *Benares Commentary*, by Jayaditya and Vamana. Of the non-Paninean school of Sanskrit grammar the most important is Hemacandra of the twelfth century, the eighth book of whose Siddhahemacandra is the main source for native Prakrit grammar. The oldest grammarian in Prakrit (q.v.) is Vararuci, said by native tradition to have been a contemporary of Kalidasa (q.v.). Here, too, there is a long series of grammarians of minor importance. The Sanskrit term for grammar, *vyākāraṇa*, analysis, is indicative of the Indian method. Systematic and exact with their passion for minute division and subdivision, the work of the Hindus in this branch of learning reached its acme in the wonderfully exhaustive work of Panini, with which no grammar can be compared till modern times. The grammar of India was of indigenous origin. It discussed phonology, etymology, and inflection, but there is almost no mention of syntax. Of the other Oriental peoples only the Arabs and the Jews developed grammatical works. Arabic grammar was founded shortly after the Hejira. Abu 'l as-Wad ad-Duil (died A.D. 688) is considered the first Arabic grammarian, and he classified the parts of speech as nouns, verbs, and particles. This branch of literature in Arabic is an enormous one, no less than 2500 writers on grammar, lexicography, and philology being enumerated. The earlier grammarians are the most important, such as al-Farahidi, and his pupil, Abu 'l Hasan al-Basri, more usually known as as-Sibawaih (latter part of the eighth century). The source of Arabic grammar is involved in obscurity. It is, however, a significant fact that many of the Arabic grammarians, like more than one of their greatest historians, were Persians by birth. Through the medium of the Syrians Greek culture penetrated Persia, and doubtless some knowledge of Greek grammar came through the same channel, so that it does not seem unwarranted to suppose that Arabic grammar, which is treated with exactness and comprehensiveness, was ultimately influenced by Greek. It is at least certain that Syriac grammars, of which that of Elia of Sobha (eleventh century) is an excellent example, were based on Greek models. The Jewish grammarians had originally the same purpose as those of Arabia, the preservation of their sacred books. In a certain sense their grammar commences with the Massorites, although it was not until the Jews came under the influence of fully developed Arabic culture that they wrote formal grammars. The oldest extant Hebrew grammatical work is a lexicon by David ben Abraham (tenth century), but the greatest is that of Yona ben Gannach, of the beginning of the eleventh century. His work, divided into forty-six chapters, leaves scarcely a problem of Hebrew grammar untouched, and though after him there were many native Hebrew grammarians, none attained to his standard.

There was but one people of the ancient world except India which evolved an independent system of grammar. This was Greece. The contrast between the two beginnings is significant of the trend of thought of the two nations. In India the impulse was given by religion, in Greece by philosophy, especially by the Sophists (q.v.), such as Protagoras and Antisthenes. Many of the technical terms still used in grammar were coined by philosophers before formal grammar was known. On the other hand, there is a certain analogue between the two peoples, for the Indians applied grammar first to the *Rig-Veda* as the Greeks to the text of the Homeric poems. It was therefore the critics of Alexandria and Pergamum who were the first Greek grammarians. Of these the pioneer was Dionysius Thrax, who taught at Rome in the first century B.C., although the *Cratylus* of Plato, which is of great historic interest in grammar (see ETYMOLOGY), contains some general statements on grammatical topics. Following Plato, Aristotle in the course of his philosophical works distinguished between nouns, verbs, and 'connectives' (Gk. *ὀνόματα*, names, *ῥήματα*, sayings, *σύνδεσμοι*, bonds, including pronouns), and he also recognized the category of case (Gk. *πτῶσις*, fall). The Stoic philosophers made important contributions to grammatical knowledge. Thus Posidonius of Rhodes (first century B.C.) gave to the five cases of the Greek noun the names which they still have. The work of Dionysius Thrax, to which allusion has been made, was, however, the most important from a formal point of view. Summing up the work of his predecessors, he set forth a grammar so complete that it formed a model for all succeeding Greek and Latin works on the subject, was the standard moreover for grammars of other languages, as for instance, of an Armenian grammar said by tradition to have been composed in the fifth century, and commented upon by Yohan Erznkachi in the fourteenth century, and still influences in form even the most modern and scientific grammars. While the Sanskrit grammarians, as we have seen, neglected syntax almost entirely, the Greeks paid special attention to this branch of grammar. This is the new contribution in the works of Apollonius Dyscolus (second century A.D.), one of the greatest grammarians who has ever lived. The grammatical work of the Romans was but an imitation of their Greek models. The two names deserving special mention are those of Varro (B.C. 116-c.28), whose work on the Latin language is of great value, and has some sections on etymology, the weakest side of Græco-Roman gram-

mar, as it is one of the strongest of the Sanskrit, and Priscian (about the close of the fifth century A.D.), whose *Grammatical Commentaries*, in eighteen books (the first two on phonology, two more on word-formation, then twelve on inflection, and two on syntax), was the standard authority through the Middle Ages. Mediæval times show no progress in grammatical work. It is true that non-classical languages received attention owing to the spread of Christianity, which offered the Scriptures in the vernaculars of the peoples to whom the new religion was carried. The only grammar in the technical sense of the word, however, of this period is the Welsh one, entitled *Desparth Edeyrn Aur*, written, as its name implies, by Edeyrn the Golden-Tongued, in the thirteenth century. With the revival of learning came a change. Latin still exercised its influence over all grammar, and the earliest Renaissance treatises are devoted to Latin in its relation to the vernaculars. One of the first works of this type was the anonymous *Tractatus dans modum teutonisandi casus et tempora* (Münster, 1451). A single sentence shows its quaint character: *Uñ eyn verbum neutrum edder neutrale heth darumme also, dat yd noch wercken edder lydent bedudet* (and a verbum neutrum or neutrale is thus called, because it expresses neither action nor passivity). The first Greek grammar of this period was that written by the Byzantine exile Constantine Lascaris (Milan, 1476). To give a history of the many classical grammars which appeared from the beginning of the Renaissance to the new epoch inaugurated by the study of Sanskrit would lead too far afield. Suffice it to say that there was no real progress made in scientific grammar of any language until the exclusive devotion to Latin and Greek gave way at the opening of the nineteenth century to the broader study of other languages as well. The first grammars of the various non-classical languages are as follows: Spanish by Ælius Antonius Nebrissensis (1492); Arabic by Peter of Alcalá (1505); Hebrew by Reuchlin (1506); Old Church Slavic, anonymously (1516); German by Ickelsamer (?) (1527); Hungarian by Erdösi (1539); Ethiopic by Victorinus (1548); French by Estienne (Stephanus) (1557); Syriac by Widmanstadt (1558); Polish by Stoienski (Statorius) (1568); Bohemian, anonymous (1567); Basque, anonymous (1587); Tagal by Santo Josepho (1610); Modern Greek by Portius (1638); Canarese by Estevano (1640); Danish by Pontoppidan (1648); Annamese by Rhodes (1651); English by Wallis (1653); Lithuanian by Klein (1653); Chinese by Kircher (1667); Portuguese by Pereira (1672); Malay by Raimonds (1674); Swedish by Wallen (1682); Lettish by Adolphi (1683); Gothic, Anglo-Saxon, and Icelandic by Hickes (1689). The geographical discoveries of this period resulted linguistically in the publication of numerous grammars, including those of Aztec (1555); Chiapa (1560); Quichua (1560); Mixteca (1593); Tupí (1595); Aymará and Araucanian (1603); Huron (1631); Guaraní (1639); Massachusetts (1666); Chayma (1680). The eighteenth century was rich in grammatical contributions. We have grammars of Tamil by Ziegenbalg (1716); Hindustani by Schultze (1741); Fanti and Accra by Protten (1764); Bengali by Halhed (1778); Marathi, anonymous (1778). The American languages also received much attention. Thus Moxan was treated by Marbau (1701); Tarsaca by Quixas (1714); Koran by Ortego (1732); Lulen by Machoni (1732); Totonacan by Bonilla (1752); Eskimó by Egede (1760); Otomi by Neve y Molina (1767); Abipone by Dobrizhofer (1784); Mohegan by Edwards (1788). The latter half of the century was marked by a steady growth of interest in comparative grammar, which was soon to revolutionize the study and the methods of the science. (The history of these branches of linguistics will be treated more properly under PHILOLOGY.) Since the opening of the nineteenth century the history of grammar in its normative aspect has been modified to some extent by the comparative method, which is also responsible in great part for the historical mode of treatment. The trammels of Latin are less felt, although the simple normative grammar of any Indo-Germanic language is almost of necessity written along the old familiar scheme. The inadequacy of such a treatment is less apparent, however, in this group of dialects than in those of other language families. Many tongues which have no case, verb inflection, or the like corresponding to the Latin must be distorted before they can be forced into the conventional mold. Such incorporating languages as American Indian are cases in point. This difficulty is, it must be confessed, almost unavoidable. The mind of the linguist is, unhappily, so fixed by the forms of his own vernacular and its kindred languages that it is almost a psychic impossibility for him to escape their influence, especially when presenting the facts of a language in the form of a grammar.

METHOD OF NORMATIVE GRAMMAR. While normative grammars vary somewhat according to the special requirements of the languages of which they treat, or according to the class of readers to whom they are addressed, they should be written in general according to a uniform outline. The comprehensive definition of the language considered by the grammar in question is given, the dialectic subdivisions are described and localized, and their mutual relations to each other are presented. The orthography, pronunciation, and main principles of accent are next considered, and then the phonology is taken up systematically, preferably in the order of vowels, semivowels, nasals, liquids, mutes (gutturals, palatals, dentals, and labials), and spirants. After the phonology comes the noun-formation, followed by the inflection of nouns and adjectives according to their various declensions, then pronouns and numerals, and finally adverbs, prepositions, conjunctions, and interjections. Next comes the section on verb-formation, followed by the verb-inflection arranged according to the different conjugations of the language under consideration. The division of syntax follows that of inflection. Here several arrangements are possible. The simplest method is to repeat the order observed in the inflectional part. The concluding portion of the syntax may often be devoted profitably to a discussion of the word order of the language, and a sketch of the metres found in the poetry should conclude the work. Comparisons of the dialects of the language with its literary form may often be introduced in their proper places. It must be borne in mind that this is the outline of a technical scientific grammar. Special grammars, as those for beginners and schools, will frequently deviate for practical

purposes more or less from the outline here given. Any arrangement which seems best for the special object of such a grammar may be adopted. The various lessons into which school grammars are frequently divided are often provided with vocabularies of new words, and with sentences for translation from and into the language treated by the work. It is not unusual to append a chrestomathy of the languages containing extracts from some of its most important literary works, and to follow this with a glossary.

Parts of Speech. In a discussion of grammar it is necessary to enumerate the relations of the various parts of speech to each other, and to state what is comprised under each of these parts. The parts of speech are usually considered to be eight in number: nouns, adjectives, pronouns, verbs, adverbs, prepositions, conjunctions, and interjections. Under these several titles will be found more full accounts of their functions. The noun is conventionally described as the name of a concrete or abstract object; the adjective modifies the meaning of a noun or pronoun; the pronoun is a word standing in place of a noun; a verb expresses action or state of being; an adverb modifies a verb, adjective, or other adverb; a preposition shows the relation between one noun or pronoun and another; a conjunction connects clauses or words; the interjection is an expression of emotion standing in no grammatical relation with the rest of the sentence. While this division is sufficient for practical purposes, it is far from satisfying scientific accuracy. The noun and adjective are particularly closely allied, so that their functions often overlap, and there is in some instances no real distinction between the two. It seems probable that in the earliest period of the Indo-Germanic languages (q.v.) there was but one group for the two, the noun, and that from the collocation of nouns, one affecting the meaning of the other, the adjective was derived as a subdivision of the noun. Similarly the adverbs, prepositions, and conjunctions are shown by comparative philology to be in most instances stereotyped case-forms of nouns. The pronouns, although in many cases, as in the demonstrative, interrogative, or relative classes, they are inflected like adjectives, form, in reality, a class distinct from the nouns. The cardinal numerals beyond four were originally nouns; below four they were in the adjective group. Verbs also form a separate class, although in the infinitive and participle they overlap the noun-adjective group. The old view that in their primitive inflection pronominal elements entered seems on the whole doubtful, although arguments may be alleged in its favor. The most primitive interjections are merely reflex emotive vocal actions, and admit of no linguistic classification. They are perhaps the most primitive forms of speech, shared, like gesture language (q.v.), by man with the animals. The developed interjections are syncopated sentences. Scientifically, then, the parts of speech are four—nouns, pronouns, verbs, and interjections. Nouns and pronouns have normally gender, number, and case. Gender may be natural, indicating male, female, and sexless, or grammatical, as German *der Tisch* (masc.), table; *die Gabel* (fem.), fork; *das Weib* (neu.), woman. Here gender has nothing to do with sex. Number shows whether the word denotes one (singular), two (dual), or more than one or two (plural). Case expresses the relations of a noun or pronoun to the word with which it is most closely related in the sentence. The number of cases varies widely in different languages. The verb, like the noun, has number, and, in some languages, gender. It also has person, mood, tense, and voice. Person denotes generally either the person speaking, the one addressed, or some other individual. Here again many non-Indo-Germanic languages have various deviations from this scheme. Moods are actual (indicative) or contingent, the most familiar examples of the latter being the subjunctive (will), optative (wish), and imperative (command). Tense expresses the time of action. Originally tense was merely present or past, the present serving as a future also, but there were later developed various subdivisions of tense, as the future and the perfect tense (present, past, and future perfect), and the like. Voice denotes whether the person is the agent (active), or is acted upon (passive), or acts in a way which affects himself (middle). The passive voice is much later in development than the active or than the middle, which has disappeared in the modern Indo-Germanic languages. All these grammatical categories are modified in various ways by different languages, and very many dialects have much more complex systems than the normal one for the Indo-Germanic group, which is here outlined.

Consult: Vater, *Litteratur der Grammatiken, Lexika und Wörtersammlungen aller Sprachen der Erde* (2d ed., Berlin, 1847); Benfey, *Geschichte der Sprachwissenschaft* (Munich, 1869); Müller, *Grundriss der Sprachwissenschaft* (Vienna, 1876-88); Steinthal, *Geschichte der Sprachwissenschaft bei den Griechen und Römern* (2d ed., Berlin, 1890); Paul, *Prinzipien der Sprachgeschichte* (3d ed., Halle, 1898); Gabelentz, *Sprachwissenschaft, ihre Aufgaben, Methoden und bisherigen Ergebnisse* (2d ed., Leipzig, 1901); Oertel, *Lectures on the Science of Language* (New York, 1901).

GRAMMAR SCHOOLS. In the Middle Ages, when the existing schools were entirely under control of the monastic or the secular clergy, a distinction was drawn between the singing-schools, or those in which instruction was limited to the elements of reading, writing, and singing, and the grammar schools, in which attention was directed to the study of language and literature, usually of a religious character. These grammar schools were, in fact, a survival or revival of the old Roman grammar schools, or schools of the grammatists. In England the term was in turn applied to the secondary schools that were established on independent foundations, and were free from direct ecclesiastical control. Such schools were also called public schools. The earliest of these was Winchester, founded in 1378, by William of Wykeham, Bishop of Winchester. During the troubles incident to the Reformation in England many of these schools were swept away, but some of them were afterwards restored. The most important of these schools, and hence often called the nine great public or grammar schools of England, are Winchester, Eton, Rugby, Charter House, Saint Paul's, Harrow, Westminster, Merchant Taylors, and Shrewsbury. These schools were devoted wholly to the study of Greek and Latin grammar and rhetoric, and

hence the title, grammar schools. The English colonists carried this type of school to America. Such an establishment was attempted in 1621 at Charles City, Va., but, owing to the troubled character of the times, it had no permanency. In 1635 the Latin Grammar School was established in Boston, and it has had a continuous existence to the present time. Many such schools were established in Massachusetts, and in 1647 a general school law was passed which contained the following provision: "It is further ordered, that where any town shall increase to the number of 100 families or householders, they shall set up a grammar school, the master thereof being able to instruct youth so far as they may be fitted for the university." Similar schools flourished in most of the colonies until near the close of the eighteenth century, when a type of secondary school, called academies, took their place.

Toward the middle of the nineteenth century the term grammar school again came into common use in the United States to indicate a type of intermediate school devoted for the most part to the study of English grammar with some attention to geography, advanced arithmetic, and history. Previous to this time the only school inferior to the Latin grammar schools and the academies was the elementary school, devoted to the study of the elements of reading, writing, and arithmetic. The system of grading was gradually introduced about the middle of the century in the larger towns of Massachusetts. The elementary and the (English) grammar school were divided into from two to four, usually three, grades each, and were amalgamated into a system under one administration—that of the superintendent of schools. The term 'grammar school' is now commonly used to designate the upper grades, ordinarily the fourth to the eighth, inclusive, of the common school, in which not only grammar, but also arithmetic, geography, history, elements of natural science, usually drawing, some form of manual training, and sometimes elementary algebra or geometry, with a foreign language, enter into the curriculum. See COMMON SCHOOLS; EDUCATION; MONASTICISM; NATIONAL EDUCATION, SYSTEMS OF; SCHOOLS; and the several grammar schools enumerated.

GRAMMA'TEUS. See SCHREIBER.

GRAMMICHELE, grăm'mē-kā'lā, or **GRANMICHELE.** A city in Sicily, 35 miles southwest of Catania (Map: Italy, J 10). It has stone and clay quarries, and markets grain, wine, cotton, fruit, and cattle. It was founded in 1693 by the Prince of Butera to take the place of the neighboring Occhiala, destroyed by an earthquake. Population of commune, in 1881, 11,804; in 1891, 15,075.

GRAMMONT, grâ'môn' (Flem. *Geertsbergen, Geeraerdsbergen*). A small town of Belgium, in the Province of East Flanders, situated on both banks of the Dender, 22½ miles by rail south of Ghent (Map: Belgium, B 4). It has an episcopal college and manufactures of lace and textiles. Population, in 1890, 10,891; in 1900, 11,999.

GRAMMONT, ORDER OF. See GRANDMONTAINS, ORDER OF.

GRAMMYSIA, grăm-mĭs'ĭ-ā (Neo-Lat., from Gk. γραμμή, *grammē*, line + μῦς, *mys*, mussel). A fossil pelecypod shell of clam-like form, with strong concentric folds, and one or more radial furrows extending from the umbones diagonally to the ventral margin of the shell. The genus appears in the Silurian rocks, but is especially abundant in the Middle and Upper Devonian marine formations, of which it is quite characteristic. The type species is Grammysia Hamiltonensis, about three inches in length.

GRAMONT, grâ'môn'. The name taken by the younger branch of the family of Aure, noblemen of Navarre. PHILIBERT (?-1580) married (1567) Diane d'Andouins (1554-1620), mistress of Henry IV.—Their son, ANTOINE II. (?-1644), was Viceroy of Navarre, and was made Duke de Gramont. Of his four sons, two are well known. —ANTOINE III. (1604-78), Marshal of France, took part in the wars in Holland, Italy, and Germany, fought in the battle of Freiburg, was taken prisoner at Nördlingen, but was exchanged immediately, and was prominent at the battle of Lens (1648). During the wars of the Fronde he was on the side of the Court. In 1657 he went to Spain to arrange for the marriage of Louis XIV. with the Infanta Maria Theresa. He married Françoise de Chioré, a niece of Richelieu. His *Mémoires* were published in 1617. The more important members of the family are treated separately.

GRAMONT, ANTOINE ALFRED AGÉNOR, Duke de (1819-80). A French diplomat. He was born in Paris, was educated at the Ecole Polytechnique, and studied to prepare himself for the diplomatic service. His opportunity for entering diplomatic life did not come until after the coup d'état of December 2, 1851. In 1852 Napoleon sent him as Minister Plenipotentiary to Cassel. In the two years following he was transferred to Stuttgart, and then to Turin, each transfer being in the line of promotion. In 1857 he was named Ambassador at Rome, and in 1861 became the representative of the French Empire at Vienna. There he remained until January, 1870, when he was called to Paris to become Minister of Foreign Affairs in the Ollivier Cabinet. In this position he played a prominent part in the events that led up to the Franco-Prussian War, and was probably responsible, more than any other man, for the precipitancy with which France rushed into the conflict. On July 15th he gave to the Chambers a distorted version of the conduct of Prussia with regard to the Benedetti affair, thereby committing France to the declaration of war which followed on the 19th. On August 9th, after the first reverses to the French arms, he resigned with the rest of the Ollivier Cabinet, amid a storm of abuse from the French press. He spent the remainder of his life in retirement, writing apologies and explanations of his conduct, in which he tried to shift the blame for the catastrophe upon others. His principal work was *La France et la Prusse avant la guerre* (1872).

GRAMONT, PHILIBERT, Count de (c.1621-1707). A celebrated French courtier. He was the son of Antoine, Duke de Gramont. While still very young he served as a volunteer under Condé and Turenne, and distinguished himself by the most chivalric bravery. At the Court of Louis XIV., with this reputation added to his youth, noble birth, a handsome person, fine talents and accomplishments, a lively wit, and good fortune at play, he had the audacity to aspire to be the rival of the King in the affections of one

of his favorites. This caused him to be banished from France in 1662. He found a refuge at the Court of Charles II. of England. Here, after many adventures, he married Eliza Hamilton, sister of Anthony, Count Hamilton. He then went to France (1664) and served in the Low Countries. His wife became one of the ladies at the Court of the Queen Maria Theresa. He had two daughters, one of whom was married to Henry Howard, Marquis of Stratford, and the other became Abbess of Poussay, in Lorraine. The famous *Mémoires du Comte de Gramont* were written by his brother-in-law, Anthony, Count Hamilton (q.v.), trans. in Bohn's Library (London, 1846).

GRAMOPHONE. An apparatus, invented by Emile Berliner for the reproduction of sound, differing from the phonograph and graphophone in that it employs a disk instead of a cylinder as its record. The original disk on which is a stylus connecting with a diaphragm vibrating under the influence of the sound-waves, is of glass, and the record is made on a lampblack surface. This disk revolves on a horizontal plane, and varies from the cylinder of the phonograph in that it cannot be used directly for reproduction, but requires a corresponding disk of hard rubber which is prepared from a metal die photographically etched from the original lampblack disk. The diaphragm is so arranged that it travels outward during the revolution of the disk on which the record is made in a long spiral. The stylus is pivoted so that it connects with the diaphragm and has a lateral motion. Save in this mechanical detail the principle of the instrument is essentially the same as the phonograph (q.v.).

GRAM'PIANS. An Australian mountain range extending north and south in the western part of Victoria (Map: Victoria, B 4). From its eastern slope flow the Glenelg and its affluents. The loftiest peak of the range, Mount William, is 4500 feet above the sea.

GRAMPIANS. The principal mountain system in Scotland, separating the Highlands from the Lowlands (Map: Scotland, E 3). They run from northeast to southwest, forming the well-known high grounds of Aberdeenshire, Kincardineshire, Forfarshire, and Perthshire. The average elevation of this main range is from 2000 to 3000 feet; the highest elevation is Ben Nevis (4406 feet), at its western extremity. An outlying branch of the Grampians extends northward from near the head of the valley to the Dee, and comprises among its chief summits Ben Machdhui (4296 feet) and Cairngorm (4048 feet). Southward to the western extremity of the Grampians are situated numerous groups and chains of greater or less extent. Among these the chief summits are Ben Cruachan (3693 feet), Ben Lomond (3192 feet), Ben More (3845 feet), Ben Lawers (3984 feet), and Shichallion (3547 feet). The Grampians present toward the Lowlands a bold aspect, but in places they slope gradually into the fertile country below, and are everywhere intersected by beautiful valleys. On the north side the mountains are more rugged and are difficult to traverse. Two railroads cross them in the wildest parts; one through the Pass of Lerry and Glenogle, and the other by way of the Pass of Killiecrankie and Glengarry. The name Grampians applied to this mountain system by modern writers represents the Graupius (changed by an error to Grampius) Mons of Tacitus, a mountain (or range), the scene of the defeat of Galgacus by Agricola, the location of which has not been determined. See Kiepert, *Lehrbuch der alten Geographie*, par. 462.

GRAMPUS (older form *grampasse*, from Sp. *gran pez*, grampus, great fish, from *gran*, great, and *pez*, fish). A genus of large dolphins (Delphinidæ), having a spindle-shaped body, thicker in proportion than that of the porpoise, from which this animal differs also in the greater height of its dorsal fin, in the upper jaw projecting a little over the lower, and in the smaller number of teeth, which are wanting in the upper jaw of adults, and are from six to fourteen in the lower jaw. The color is slaty-gray more or less streaked with white. The genus is nearly related to that of the caaing whale (q.v.). Several species are known in the northern oceans and in the Mediterranean Sea. The common grampus, or 'cowfish' (*Grampus griseus*), is sometimes twenty feet long, and is a slow-moving, wholly inoffensive animal. It feeds on squid, swimming mollusks, and small fish. The name 'grampus' is popularly applied to almost any cetacean which is too large to be called a porpoise and too small to be called a whale.

GRAN, grän (Hung. *Esztergom*, Lat. *Strigonium*). A royal free town of Hungary and capital of the county of the same name, on the right bank of the Danube, 25 miles northwest of Budapest (Map: Hungary, F 3). It consists of the town proper, the archiepiscopal or 'water' town, and two suburbs; and is the seat of the Prince Primate of Hungary. The most striking architectural feature is the large cathedral, built in 1821-56, in the Italian Renaissance style, in a commanding position, with an imposing dome like that of Saint Peter's in Rome. The church is 348 feet long, and is the most beautiful one in the kingdom. The elaborate interior is adorned with several fine paintings, monuments, and chapels. Among other noteworthy buildings are the Church of Saint Anne, with its dome, the old and the new archiepiscopal palaces of the Primate, the seminary for priests, the county building, and the town hall. The suburbs are attractively laid out, and have handsome residences. Agriculture is the chief industry, and wine the principal article of commerce. Several warm saline and sulphur springs afford medicinal baths. Population, in 1890, 15,749; in 1900, 16,948. Gran, which is one of the oldest towns of Hungary, was the residence of the Hungarian Prince Gejza; and here was born his son, Saint Stephen, first King of Hungary, who was converted to Christianity in 1000, and established the See of Gran the next year. The town was a great commercial centre, but was destroyed by the Tatars in 1241 and never regained its former importance. Between 1543 and 1683 it was held by the Turks.

GRANACCI, grä-nä'chē, Francesco (1477-1543). A Florentine painter, friend of Michelangelo, and pupil of Ghirlandajo. After his master's death he completed many of the paintings which the former had left unfinished, but his later manner was nearer to Raphael and da Vinci. He collaborated with Michelangelo on the frescoes of the Sistine Chapel. His principal works are: at Florence, a "Virgin Giving Her Girdle to Saint Thomas," at the Uffizi, and at the Pitti a "Holy Family;" at Berlin, a "Trinity;" and at

the Old Museum at Munich, a "Mary with the Babe," a "Magdalen," "Apollonia," "Jerome," and "John the Baptist."

GRANADA, grà-nä'dà, *Span. pron.* grà-nä'ᴅà. The capital of the Department of Granada, Nicaragua, situated on the northwest shore of Lake Nicaragua at the foot of the extinct volcano of Mombacho (Map: Central America, D 5). It is in a cacao-growing district and carries on trade in goldsmith's work, indigo, dyewoods, cacao, and hides. The town is the northern terminus of the lake steamship line. Population, 12,000. Granada was founded by Fernando de Córdova in 1524, and was formerly the capital of the country.

GRANADA. A former kingdom of Andalusia, Spain, situated along the southern coast, and bounded on the north by Cordova and Jaén, on the east by Murcia, on the south by the Mediterranean, and on the west by Seville. It comprises the modern provinces of Malaga, Granada, and Almería, with an aggregate area of 10,950 square miles. It is mountainous throughout, its eastern half being traversed by the snow-clad Sierra Nevada, reaching in the Cerro de Mulhacen a height of 11,420 feet. The principal river is the Jenil, a tributary of the Guadalquiver, whose valley, the 'Vega of Granada,' is a veritable garden. Mining and agriculture are the chief resources of the inhabitants, the former producing lead, zinc, iron, silver, and coal; the latter sugar, flax, fruit, grain, and, above all, wine and oil. There are some manufactures of textiles, chocolate, and bricks, and some oil and flour mills. Communications are still in a backward state, although a railroad has been completed from Almería to Malaga and connected through Jaén and Cordova with Madrid. The population in 1900 was 1,381,048. The capital is Granada (q.v.).

HISTORY. There has been considerable dispute concerning the etymology of Granada. There is no foundation for the statement that the city of Granada owes its name to its resemblance to a ripe pomegranate. As the Saracens, who invaded Spain in 711, were by no means a homogeneous race, it was found necessary to allot various portions of the conquered territory to the different elements among the conquerors. In the rich Vega (valley) of the Elvira were settled the Syrians of Damascus, and these were the nucleus around which the Moorish Kingdom of Granada was afterwards built up. In 1228 Beni Had, descended from the old Moslem kings of Saragossa, rebelling against the declining authority of the fanatical Almohades, made himself master of Granada, together with several other towns. But he in turn was overthrown within a few years by Mohammed Al Ahmar (the Fair or the Ruddy), and when by the Christian victories the latter was restricted to the rich districts in the extreme south of the Peninsula, the Kingdom of Granada fairly began. Al Ahmar was a great soldier and legislator, but still better is he remembered as the builder of the magnificent red pile on the slopes of the hills near the city of Granada. About 1273 Al Ahmar was succeeded by his son Mohammed II. The latter began war almost immediately against Castile. As long as he was aided by Yusuf, the ruler of Morocco, his armies were victorious, and after the battle of Ecija in 1275 advanced even to the gates of Seville. But in the following year Yusuf withdrew his aid and even gave a subsidy to the King of Castile. Moslem progress was checked, and when Mohammed II. died in 1302 the Moorish power depended only upon the dissension prevailing among the Christians. For several years Granada was a prey to disorder and anarchy. During the reign of Yusuf (1333-54) was fought the great battle of Salado (1340) in which Alfonso XI. was completely successful. In 1362 Peter the Cruel of Castile (1350-69) lured King Abu Said to Seville and killed him with his own hand. Thereafter calamity followed upon calamity, and palace revolution upon palace revolution. The Moors had been able to conquer, but they lacked all genius of political organization, and in the management of affairs of State the harem was usually supreme.

In 1482 Ferdinand and Isabella entered upon a war for the overthrow of the Kingdom of Granada and the subversion of Moorish dominion in Spain. They were aided by the civil wars which raged in Granada. (See BOABDIL.) On November 25, 1491, the city of Granada, the last stronghold of the Moslems, capitulated, the negotiations having been carried to a successful issue by Gonsalvo de Córdova, and in January, 1492, the sovereigns of Castile and Aragon made their entry into the far-famed Moorish capital. At the height of its power the Kingdom of Granada is said to have contained 3,000,000 inhabitants. See GRANADA (city).

Consult: Burke, *History of Spain* (2 vols., London, 1895); Bourke, *A Concise History of the Moors in Spain* (London, 1811); Müller, *Die letzten Zeiten von Granada* (Munich, 1863); Irving, *A Chronicle of the Conquest of Granada* (Philadelphia, 1829).

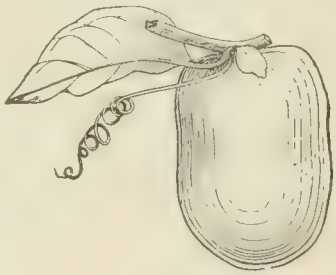
GRANADA. A city of Spain, capital of the former Moorish kingdom, and of the modern Province of Granada, about 225 miles south of Madrid; on the River Jenil, near the centre of the province (Map: Spain, D 4). It is situated about 2200 feet above the sea, at the base and on the slope of two spurs of the Sierra Nevada. It comprises several parts, the little River Darro forming a natural division between the suburbs of Albaicin and San Lorenzo and the greater part of the modern city on the north, and the Alhambra and the ancient suburbs of Churra and Antequeruela on the south. The Albaicin, once the residential quarter of the Moslem nobility, is now in ruins, inhabited principally by gypsies. Granada enjoys a delightful climate under a clear blue sky, and rises picturesquely among the terraced hills covered with luxuriant vegetation and surmounted by the towers of the Alhambra. Though a 'living ruin,' it is still a city of remarkable beauty and distinction, retaining in a large measure its Moorish character. On the north are remains of the walls that surrounded the city of old, the last towers having been destroyed by the French in 1812, though some of the gates are still in existence. The streets, with the exception of those in the modern suburbs, are crooked and narrow, and the houses of Oriental architecture. Many old gardens with Moorish fountains have been preserved and there are several fine plazas. The Plaza del Triunfo, extending from the Puerto de Elvira to the Plaza de Toros, is the largest in the city, and has a central monument, gardens, and a magnificent promenade; the Plaza de Bibarrambla, or la Constitución, was the scene of many factional conflicts in the time of the

Moors, and of various Moslem and Christian festivals, tournaments, etc.; the Plaza Nueva, laid out on a Roman bridge over the Darro, is the lower terminus of a street leading to the Alhambra. The beautifully shaded Alameda is continued along the Jenil by the attractive Paseo del Salón and Paseo de la Bomba, while on the opposite bank is the Paseo del Violón.

Preëminent among the architectural features of Granada is the Alhambra (q.v.). The Generalife, the summer palace of the Moorish princes, is next in interest among the ruined splendors of the Moslem power. Other examples of the Moorish style are still extant, and a number of the Christian churches of to-day are constructed on Moorish foundations, some of them incorporating parts of the mosques which they supplanted. Besides the cathedral, one of the finest Renaissance structures in Spain, there are many notable churches, that of San Jerónimo having an historical interest, since it contains the tomb of Gonsalvo de Córdova, whose remains, however, were desecrated by a mob and thrown to the winds. The cathedral, by Diego de Siloe, dating from 1529, though not completed until a century later, is richly decorated with marbles, and has numerous statues and paintings by Spanish artists, and the tombs, among others, of Ferdinand and Isabella in the Royal Chapel, which was founded by them. Granada is an archiepiscopal see. It is the seat of a university, founded in 1531, with five faculties and three hundred students, occupying the old monastery of the Compañía de Jesús (Jesuits), and has a theological seminary and several other colleges, a normal school, and a school of fine arts. There are the provincial and the university library with 40,000 volumes and valuable manuscripts, a botanical garden, the museum of the Alhambra, and archæological and art museums. The charitable institutions include several hospitals and houses of refuge, an insane asylum, a maternity hospital, an asylum for the poor, etc. The imposing fortress (Torres Bermejas), built as a protection against the rebel Mozarabs, or Christian partisans of the Moors, has been converted into a prison. Industrially, Granada is comparatively unimportant; it has, however, manufactures of textiles, paper, leather, liquors, hats, soap, flour, starch, macaroni, chocolate, etc. There is considerable commerce with the adjacent provinces, the trade being confined largely to the agricultural products of the Vega of Granada, celebrated in history as the scene of contest between the Moorish and Christian chivalry, but known also for its fertility. Population, in 1900, 75,570.

Granada arose near the site of the ancient *Illiberis*, the *Eliberi* of the Iberians. It is mentioned in the accounts of the early Arabian authors, and probably existed in the seventh century A.D. Occupied by the Saracens in the eighth century, it became in the thirteenth century the capital of the extensive Kingdom of Granada, and developed under the Moorish rule into a renowned centre of wealth, learning, and power, at its zenith having, it is said, between 400,000 and 500,000. The last stronghold of the Moorish power, it was invested by the armies of Ferdinand and Isabella, and after a twelve months' siege, famous for heroic exploits on both sides, it surrendered at the close of 1491, and in January, 1492, the Christian sovereigns made their entry into the city. There were numerous tumults and revolts occasioned by the events leading up to the final expulsion of the Moors in 1609; meanwhile Granada was slowly declining. The city was taken by the French in 1810 and in 1823, and in most of the revolutionary movements of the nineteenth century it played a part, being known as a liberal stronghold. Earthquakes caused some damage in 1884-85, and a fire in 1890 raged over a part of the Alhambra.

GRAN'ADIL'LA (Sp., diminutive of *granada*, pomegranate). The edible fruit of certain species of passion-flower (q.v.). The common granadilla (*Passiflora quadrangularis*) is extensively distributed over tropical regions and much cultivated. The plant is a luxuriant and very ornamental climber, often employed to form ar-



GRANADILLA (*Passiflora quadrangularis*).

bors and covered walks. It has large, beautiful, and fragrant flowers; oblong, fragrant fruit, often six inches in diameter, with a sweet and slightly acid pulp, very gratefully cooling. It is often eaten with wine and sugar. The apple-fruited granadilla, or sweet calabash (*Passiflora maliformis*), is plentiful in the woods of Jamaica, where it forms a considerable part of the food of wild swine. It is a very agreeable fruit, about two inches in diameter, with a gelatinous pulp and a rind so hard that it is sometimes made into snuff-boxes and toys. The laurel-leaved granadilla (*Passiflora laurifolia*), sometimes called water-lemon in the West Indies, has very long tendrils and bears red and violet flowers, and a fruit about the size of a hen's egg. The pulp, which is of a delicious, slightly acid flavor, is so watery that it is usually sucked through a hole in the rind. Several kinds of granadilla are occasionally cultivated in hothouses. In the south of Europe, Florida, and southern California they grow in the open air. *Passiflora alata*, a native of Brazil, by some botanists considered identical with *Passiflora maliformis*, produces an edible fruit about five inches long that is considered one of the best of the granadillas. Many of the other species have edible fruits. *Passiflora incarnata*, called maypops, is common in the Southern United States, where its fruits are eaten. See Colored Plate of PASSION-FLOWERS.

GRANARD', GEORGE FORBES, Earl of (1685-1765). An English sailor and diplomat, born in Ireland, son of Arthur Forbes, second Earl of Granard, and Mary Rawdon. He entered the navy when he was seventeen, and was under Rooke at the taking of Gibraltar. After serving at Malaga (1704), in the Channel, capturing French privateers (1705), and at the siege of Ostend (1706), he was transferred to the cavalry, but left it after a year (1708). On the recom-

mendation of Queen Anne he was put in command of the *Grafton* (1709). After a splendid, half-piratical encounter with the Genoese, he joined the Allies and was slightly wounded at Villaviciosa (1710). His capture of the Genoese fleet was disowned by the British Government, but Forbes received £6000 for his share of the booty. After the Peace of Utrecht he commanded a fleet in the Mediterranean, and in 1719 was sent to Vienna to carry out the scheme of Charles VI. to establish a great naval power in Naples or Sicily or on the Adriatic, but this came to nothing. He defended Gibraltar (1727); became Governor of the Leeward Islands (1729); and in 1730 had a mad scheme to lead a colony to Lake Erie to act as a block against French invasion or encroachment from Canada. His last naval service was in 1731 in the Mediterranean. Two years later he was sent as Minister to Russia, and made a commercial treaty with that power. In 1742 he retired from the navy because of a quarrel with the Ministry. In 1714 he had entered the House of Commons and had led the opposition to Robert Walpole; but he soon afterwards retired to private life. He married, in 1709, Mary, daughter of William Stewart; and on his death left a daughter and two sons, John (1714-96) and George, who succeeded him in the earldom. Consult Forbes, *Memoirs of the Earls of Granard* (London, 1858).

GRAN'BERY, John Cowper (1829—). An American clergyman of the Southern Methodist Episcopal Church, born at Norfolk, Va. He graduated at Randolph Macon College in 1848, entered the Methodist ministry, and acted as chaplain in the Confederate Army. After preaching in Washington, Richmond, and Petersburg he became professor of moral philosophy and practical theology in Vanderbilt University in 1875, and seven years later was elected a bishop in the Southern Methodist Church. His publications include: *A Bible Dictionary* (1885); *Twelve Sermons* (1896); and *Experience, the Crowning Evidence of the Christian Religion* (1900).

GRAN'BURY. A town and the county-seat of Hood County, Tex., 200 miles north of Austin, on the Brazos River and on the Fort Worth and Rio Grande Railroad (Map: Texas, F 3). It has cotton-gins, a flour-mill, etc., and is surrounded by a farming district. Population, in 1890, 1164; in 1900, 1410.

GRAN'BY. A town of Shefford County, Quebec, Can., on a tributary of the Yamaska River, 41 miles southeast of Montreal by rail (Map: Quebec, D 5). It has manufacturing industries and abundant water-power. Population, in 1891, 1710; in 1901, 3773.

GRANBY, John Manners, Marquis of (1721-70). An English general, the eldest son of the third Duke of Rutland. Educated at Eton and Cambridge, he was at an early age elected member of Parliament for Grantham. In the rebellion of 1745 he raised a regiment of infantry, and accompanied the Duke of Cumberland into Scotland. Appointed colonel of the Horse Guards in 1755, in February, 1759, he received the rank of lieutenant-general, and soon after was sent to Germany, as second in command, under Lord George Sackville, of the British troops coöperating with the King of Prussia. For his conduct after the battle of Minden he was appointed commander-in-chief of the British troops, holding that post during the remainder of the Seven Years' War, and distinguishing himself in various engagements. In 1760, during his absence with the army, he was appointed a member of the Privy Council. After the peace of 1763 he was constituted master-general of the ordnance, and in 1766 commander-in-chief of the army. He died at Scarborough.

GRAN CANARIA, grän kä-nä'rê-ä. One of the Canary Islands (q.v.), among which it ranks third in size and second in population, situated 74 miles from the northwest coast of Africa. It is almost circular in shape, with an area of 523 square miles. It is of ancient volcanic origin, with a number of extinct craters, none of which have been active within historical times. It is rugged, mountainous, and picturesque. The coasts fall in most places abruptly into the sea, and in general the land rises in terraces to the interior. In Los Pechos it reaches a height of 6430 feet. The climate of the island is delightful, and one of the most healthful in the world, ranging from 60° in winter to 80° in summer. The vine is one of the principal plants cultivated, and some coffee is grown, but the chief occupations of the inhabitants, who in 1900 numbered 128,059, chiefly concentrated around the capital, Las Palmas (q.v.), are fishing, commerce, and the caring of tourists, who annually number from 60,000 to 70,000. It was not until 1483, seventy-eight years after the first landing of Béthencourt, that the brave islanders were finally subdued by the Spaniards.

GRAN CAPITÁN, kä'pê-tän', El (Sp., The Great Captain). A surname of the famous Spanish soldier Gonsalvo Córdova.

GRAN CHACO. See Chaco, El Gran.

GRAND, Sarah. The assumed name of Frances Elizabeth Clarke, an English novelist. She was born in Ireland of English parents, and married, at the age of sixteen, Lieutenant-Colonel McFall of the English Army, whom she accompanied in his travels in the East, visiting India, China, and Japan. At the age of twenty-six she wrote *Ideala*, which was followed by *The Heavenly Twins* (1893). The latter book, to which she owes her reputation, was completed at a much earlier date, but could not find a publisher for several years. She has also published a collection of stories entitled *Our Manifold Nature* (1894); *The Beth Book* (1897); *The Modern Man and Maid* (1898); and *Babs the Impossible* (1900).

GRAND ALLIANCE. A league formed in 1701 by England, the Netherlands, and the German Emperor, joined later by Prussia, Portugal, and Savoy, to prevent the union of the crowns of France and Spain under the Bourbon Dynasty. See France; Succession Wars, paragraph on the *War of the Spanish Succession.*

GRAND ARMY OF THE REPUBLIC. A patriotic society organized in Decatur, Ill., on April 6, 1866. Its existence is primarily due to Dr. B. F. Stephenson and Chaplain W. J. Rutledge, of the Fourteenth Illinois Infantry, who, in February, 1864, conceived the idea of its formation. The principal objects of the order are to maintain and strengthen the fraternal feelings which bind together the soldiers, sailors, and marines who united to suppress the Rebellion; to perpetuate the memory and history of those who have died; and to lend assistance to the needy

and to their widows and orphans. The society admits to membership any soldier or sailor of the United States Army, Navy, or Marine Corps, who served between April 12, 1861, and April 9, 1865, and was honorably discharged, and also members of State regiments who were called into active service and were subject to the orders of the United States general officers. The official badge consists of a miniature strap and ribbon showing the national flag, from which is hung the brass star of the membership badge. This star shows a medallion, on which in relief are a soldier and sailor clasping hands in front of a figure representing 'Liberty,' while in the foreground are two freedmen; the entire design being supported on the sides by the national banner. The Grand Army is organized into departments, representing the States and Territories, and numbers nearly 7000 local societies. The membership in 1890 reached a total of 409,487, but this number has steadily decreased since, and in 1892 was less than 250,000. The annual death-rate is at present about 9000. Annual meetings, called encampments, are regularly held in the leading cities of the Union. The members wear on official occasions a dark-blue uniform and black slouch hat. To this organization is due the establishment of Memorial Day on May 30th of every year. Because of its large membership, its close organization, and its nearly unanimous adherence to Republican policies, the Grand Army has necessarily exerted a powerful, if often indirect, influence upon national politics and the choice of national candidates. Every elected Republican President from Grant to McKinley served in the Civil War, and polled practically the entire Grand Army vote. In 1869 the Grand Army laid down the rule that the organization should in no way be used for partisan purposes, partisan discussion, or political nominations. But while the letter of this law was kept, the Grand Army has no doubt influenced the cause of pension legislation. The Disability Act of 1890, doubling the pension roll, was due to it; so were earlier and later laws in some part, and so was the insistence upon a liberal interpretation of the laws. The Army has been also, and beneficently, active in the care and education of the orphans of deceased comrades and in the establishment of soldiers' homes.

GRAND ASSIZE. A valuable early form of the jury, instituted by Henry II. for the purpose of trying the title to land. It was available only to the tenant or defendant in a proceeding originated by a writ of right, who was offered the choice of defending his title by wager of battle or by the grand assize. The jury was composed of 'lawful knights, girt with swords' (instead of, as was the case with the petit jury, 'good and lawful men' of the vicinage), appointed by a body of four knights, chosen by the sheriff. It consisted of twelve or sixteen men, it is uncertain which, though it would seem that the four electors were entitled to add themselves to the twelve chosen by them. The institution of the grand assize was one of the great reforms in legal procedure, as it marked the decay of the barbarous method of trial by battle and the establishment of the system of trial by jury. It survived until abolished along with real actions by act of Parliament in 1834 (3 and 4 Wm. IV., c. 42). See ASSIZE; JURY. Consult: Thayer, *Preliminary Treatise on Evidence at the Common Law* (Boston, 1898); Pollock and Maitland, *History of English Law* (2d ed., Boston, 1899).

GRAND BANK. An elevated submarine plateau of triangular shape in the Atlantic Ocean, stretching for 200 miles along the coast of Newfoundland, and extending southeast for over 500 miles toward the coast of Europe. It has an average depth of 40 fathoms, ranging from a minimum of 10 fathoms to a maximum of 160 fathoms. It is supposed to be composed of deposits of solid matter brought from the Arctic seas by icebergs, which gradually melt by contact with the warm current of the Gulf Stream in these latitudes. The British and French submarine cables lie along this elevation. Near the American coast the Grand Bank teems with marine life, and is noted as the favorite resort for codfish. Some 100,000 fishermen of British, American, and French nationalities, in specially equipped vessels, styled 'bankers,' ply their vocation amid the many dangers of storm, fog, and icebergs incidental to the region.

GRAND BANK. A town and port of entry in the Burin district, Newfoundland, on the southeast side of Fortune Bay (Map: Newfoundland, E 5). The chief industries are connected with the fisheries, and an important trade is carried on with the French island of Saint Pierre. Population, in 1891, 1170; in 1901, 1427.

GRAND CANAL, THE (It. *Canale Grande*). The chief waterway of Venice, a canal 30 to 60 yards wide, which winds through the city in the shape of the letter S. On it are situated many of the famous palaces of Venice, still distinguished by the posts painted with the owners' heraldic colors. It is crossed by the famous Rialto bridge.

GRAND CANARY. See GRAN CANARIA.

GRAND CAÑON OF THE COLORADO. See COLORADO RIVER.

GRAND CAPE, kā'pē (Lat. *cape*, take, from initial word of the writ). In English law, the name of an ancient writ whereby, in an action of dower, on the failure of the defendant to appear in answer to the summons, a third part of his lands are attached to await the decision of the court. If the defendant do not appear on the return of the writ of grand cape, judgment is given in favor of the widow, who is thereupon entitled to take possession of the lands in satisfaction of her dower.

GRAND'-COMBE, gräN'kôNb', LA. A town in the Department of Gard, France, 31 miles northwest of Nîmes (Map: France, K 7). It has glassworks, and in its vicinity are productive mines of coal, zinc, and iron. Population, in 1901, 11,484.

GRAND CORRUPTER, THE. An epithet earned by Sir Robert Walpole through his frank policy of bribery and corruption, when Prime Minister of England, in securing the support of the House of Commons.

GRAND'COURT, HENLEIGH MALLINGER. A prominent character in George Eliot's *Daniel Deronda*.

GRAND COUTUMIER OF NORMANDY. A collection of the ancient customary law of Normandy, supposed to have been compiled about the middle of the thirteenth century. It is one of the most important of a large number of similar collections made in France and Germany at that period. There is no ground for the belief

that the *Grand coutoumier* was carried over from Normandy to England or that it was ever regarded as English law. It was originally written in Latin, but was early translated into French. The best recent editions are that of De Gruchy (Jersey, 1881), and Tardif (Rouen, 1896).

GRAND CYRUS, grän sē'rus', Le (Fr., the great Cyrus). The sub-title of Scudéry's *Artaméne*, an obvious parody on the name of Le Grand Condé. The hero of the story is a caricature of that historic personage.

GRANDE CHARTREUSE, grän'd shär'trēz'. See Chartreuse, La Grande.

GRANDE DUCHESSE DE GÉROLSTEIN, grän'd dü'shĕs' de zhâ'rôl'stăn', La. An opera bouffe of Offenbach produced at the Variétés in 1867, the libretto being by Meilhac and Halévy. Fritz, a fine-looking soldier, attracts the attention of the Grand Duchess at a review, and is rapidly advanced to her favor, which, however, he loses when his love for Wanda is discovered.

GRANDE ÉCAILLE, grän dâ'kī'y' (Fr., great scale). The tarpon (q.v.), so called by French-speaking fishermen along the coast of the Gulf of Mexico (often locally corrupted into 'grandkyke').

GRANDEES, grăn-dēz' (Sp. *grandes*, great men). The name by which the most highly privileged class of the nobility of Castile were known after the thirteenth century. The honors of the grandees were hereditary; they held lands from the Crown, were exempted from taxation, could not be imprisoned for debt or subjected to torture, and could not be summoned before a civil or criminal tribunal without a special warrant from the King. They were entitled to decide private feuds by an appeal to arms, and had a right to leave the kingdom, and even to enter the service of a foreign prince at war with Castile, without incurring the penalties of treason. Gradually the grandees monopolized the high offices of State, and even invaded the King's Council. Besides these privileges, which were common to them with the rest of the higher nobility, the grandees possessed several which were peculiar to themselves, or which they shared only with the so-called *titulados*—the counts and dukes. Of these, the chief was the right, in all public transactions, of remaining covered in the presence of the King. The King addressed a grandee as *mi primo*, 'my cousin german'; whereas any other member of the higher nobility he called only *mi pariente*, 'my relative.' In the national assemblies the grandees sat immediately after the prelates and before the *titulados*. They had free entrance into the palace and into the private chambers of the monarch, and on the occasion of religious solemnities they had their place in the royal chapel next to the altar. Their wives shared their dignities, the Queen rising from her seat to greet them. Under Ferdinand and Isabella, Cardinal Ximenes succeeded in checking the power of the feudal nobility by ignoring their time-honored privileges and rewarding men of low birth with important offices. Charles V. and Philip II. continued the policy of Ferdinand and Isabella, and succeeded in making the grandees a dependent Court nobility. Gradually three classes of grandees arose out of this merely nominal nobility. It was the privilege of the first class to be commanded by the monarch to be covered before they had begun to address him. At the coronation of Charles V. at Aix-la-Chapelle, the princes of the Empire refused to assist at the ceremony if the grandees were allowed to be covered, and for once the grandees renounced the privilege. After the accession of Joseph Bonaparte in 1808, the dignities and privileges of the grandees were entirely abolished, but they were partially reëstablished at the restoration in 1814.

GRANDE MADEMOISELLE, grän'd mâ'd'-mwä'zĕl', La. A title given to Anne Marie Louise d'Orléans, Duchesse de Montpensier, for her beauty, wealth, and valor. See Montpensier.

GRANDES CHRONIQUES DE FRANCE, grän'd krô'nĕk' de fräns (Fr. Great Chronicles of France). An historical prose compilation begun by a monk of Saint-Denis in 1274, and continued by the members of that community until the reign of Charles V., after which it was continued by lay authors to the time of Louis XI.

GRANDET, grän'dâ', Eugénie. The heroine of Balzac's novel *Eugénie Grandet*. Her love and sacrifice for her cousin are unrequited.

GRAND FALLS. A magnificent cataract of the Grand River (q.v.), Labrador, British America, in latitude 53° 50′ N., longitude 63° 50′ W. (Map: Canada, S 6). From a pool, four miles above the falls, the river makes a rapid descent of 200 feet between gradually narrowing banks until it shoots over a rocky platform 200 feet wide into a mighty chasm 316 feet below. The deafening roar of the falls can be heard at a distance of 20 miles. Below the falls there is another rapid descent of 300 feet; the total descent from the pool above the falls to the sea is 2000 feet. The cañon through which the river falls is 25 miles long, with an average depth of 400 to 500 feet. The first European to see the cataract was Mr. McLean, a Hudson Bay Company official, in 1839. Accounts of its existence had become mythical until it was rediscovered by two separate expeditions in 1891, and officially surveyed by the Canadian Geological Survey in 1894.

GRAND FALLS, or **COLE'BROOKE.** A port of entry of Victoria County, New Brunswick, Can., 77 miles southwest of Chaleur Bay (Map: New Brunswick, B 2). It is at the head of navigation on the river Saint John, 200 miles from Saint John on the Bay of Fundy, with which it has steamboat communication. It is a favorite tourist and sporting resort on account of its fine scenery, cool climate, partridge and duck shooting. The falls, variously estimated at from 50 to 100 feet high, are very picturesque; a good view of them is obtained from a fine suspension bridge which spans the river. Population, 1500.

GRANDFATHER'S CHAIR. Two series of tales for children by Nathaniel Hawthorne, published respectively in 1841 and 1842. The stories are about famous persons and events in early American history.

GRAND FORKS. A city and the county-seat of Grand Forks County, N. D., 79 miles north of Fargo, at the confluence of Red Lake River with the Red River of the North, and on the Great Northern and the Northern Pacific railroads (Map: North Dakota, H 2). It is the seat of the State University, opened in 1884, Saint Bernard's Convent and College (Roman Catho-

lic), and the Northwestern Normal College. The city is the centre of a fertile agricultural and lumbering district, and has an extensive trade in wheat, flour, lumber, live stock, etc.; its industrial establishments include flour and lumber mills, grain elevators, brick-yards, a foundry, boiler-works, and a woolen mill. The water-works and electric-light plant for street lighting are owned by the municipality. Grand Forks was settled in 1871, and was incorporated ten years later. Population, in 1890, 4979; in 1900, 7652.

GRAND HA'VEN. A city, port of entry, and the county-seat of Ottawa County, Mich., 31 miles west-northwest of Grand Rapids, on Lake Michigan at the mouth of the Grand River, and on the Detroit, Grand Haven and Milwaukee, and the Pere Marquette railroads (Map: Michigan, G 5). It has a public-school library, Akeley College for Girls, and Highland Park. There is a fine harbor with steamboat lines to the principal lake ports, and a valuable trade is carried on. Grand Haven is the centre of extensive fishing, and fruit and celery-growing interests, and has manufactures of engines, refrigerators, furniture, pianos, barrels, baskets, shoes, etc. First settled in 1835, Grand Haven is governed by a mayor, elected annually, and a city council. The water-works and electric-light plant are owned and operated by the municipality. Population, in 1890, 5023; in 1900, 4743.

GRANDIDIER, grän'dê'dyâ', ALFRED (1836—). A French explorer, born in Paris. When about twenty he made his voyage to South America with his brother, Ernest Louis Marie (1833—), the collector, and M. Janssen. After traveling extensively in the Americas he went to India (1863), Ceylon, and traveled along the east coast of Africa. In 1865 he first visited Madagascar. In several succeeding visits he collected the material for his *Histoire physique, naturelle et politique de Madagascar*, a work comprising forty volumes, the first of which appeared in 1876, and which is the authority on the island. His other works include some valuable maps, and *Histoire de le géographie de Madagascar* (1893); *Les voyageurs français à Madagascar pendant les trente dernières années* (1894).

GRAND INQUEST. See GRAND JURY.

GRAND ISLAND. A city and the county-seat of Hall County, Neb., 153 miles west by south of Omaha, on the Union Pacific, the Burlington and Missouri River, and the Saint Joseph and Grand Island railroads (Map: Nebraska, F 3). It is the seat of Grand Island College (Baptist), opened in 1892, and has a public library, Saint Francis Hospital, and the Nebraska Soldiers' and Sailors' Home. There are several wholesale and retail establishments, a large beet-sugar factory, a canning factory, a flouring-mill, a broom-factory, etc., and railroad shops of the Union Pacific. The city carries on an extensive grain trade. Settled in 1869, Grand Island was incorporated in 1872. Under a charter of 1901, the government is administered by a mayor, elected every two years, and a city council. The water-works are owned and operated by the municipality. Population, in 1890, 7536; in 1900, 7554.

GRANDISSIMES, grän'dê'sêm', THE. A novel by George W. Cable (1880), the story of an old New Orleans family, the Grandissimes, between whom and the De Grapions an old feud led finally to the extreme poverty of two lovely Creoles. A reconciliation brings about marriages for both. The time is the beginning of the nineteenth century, and the work presents a vivid picture of Creole life.

GRAND JUNCTION. A city and the county-seat of Mesa County, Colo., at the junction of the Grand and Gunnison rivers, and on the Denver and Rio Grande, the Colorado Midland, and other railroads (Map: Colorado, C 2). It is one of the most important towns in western Colorado, and is the centre of a fertile agricultural region, served by a large irrigation canal, and is especially noted for its fruits. There are extensive coal interests, and machine-shops, lumber-yards, brick-yards, flour and planing mills, a beet-sugar factory, a pyritic smelter, etc. Grand Junction is the seat of Teller Institute, which has over one hundred and fifty Indian pupils. The water-works are under municipal ownership, and Grand Junction is said to be the only town in the United States owning its street-car line. Population, in 1890, 2030; in 1900, 3503.

GRAND JURY. The assembly of good and sufficient men, summoned by order of the sheriff to attend every session of the peace, and every commission of over and terminer and general jail delivery in England, for the purpose of inquiring into the charges of offenses, and of returning to the court their delivery thereon. The institution of the grand jury dates back to the earliest period of English history, having been in use among the Saxons. It would seem from a law of Ethelred that the number of the grand jury was originally twelve; but we learn from Bracton that, in the time of Henry III., it was the practice to return four knights for every hundred, who elected twelve other knights, or else twelve *liberos et legales homines*, to take part with them in the inquest. Toward the latter part of the reign of Edward III., in addition to the inquest for the hundred, the sheriff was required to return a panel of knights for the whole county. This jury was called *le graunde inquest*, and made inquiry for the county, while the jury for the hundred inquired for its own district only. After the establishment of the *graunde inquest*, the practice of summoning a jury of the hundred gradually went out of use; but until 6 Geo. IV., c. 50, it was deemed necessary that some of the grand jury should be summoned for every hundred. At the present day, the grand jury must consist of no fewer than twelve, nor more than twenty-three members. A grand jury is summoned for every assize, and for the quarter-sessions in counties and boroughs. After having the oath administered, and receiving a charge from the judge, the grand jurors retire to their room, and the various indictments, which are called bills, are laid before them. The duty of the grand jury is simply to inquire whether there is sufficient *prima facie* evidence to require a trial. For this purpose they may require the same evidence, written and parol, as may be necessary to support the indictment at the trial. But in practice, having ascertained that the Crown has a sufficient *prima facie* case, they return a true bill, the prisoner's evidence being reserved for the trial. Witnesses are sworn on their examination before the grand jury by an officer appointed by the court. When the jury have come to a con-

clusion, the clerk indorses on the indictment *a true bill* in case the jury, or a majority of twelve, are satisfied that the case is sufficiently strong. In case they are not satisfied, the indictment is indorsed *not a true bill*. The foreman, accompanied by one or more of the jurors, then carries the indictments into court, and presents them to the clerk, who states to the court the nature of the charge and the indorsement of the jury.

In this country the grand jury is also summoned by the sheriff, and, as in England, its function is, upon such evidence as the attorney of the State may present, to determine whether persons accused of crime shall be indicted and tried therefor, and to inquire into such other matters as may be confided to them by the court, or may come to their knowledge. They may accordingly make presentment of any matter requiring remedial action by the courts or the legislature, as the general prevalence of crime, the inefficiency of the law or of its administrative agents, the neglect of their duty by public officials, and the like. In inquiring into the commission of a particular criminal charge, they do not examine witnesses for the defense; for it is not their duty to find a verdict, but only to decide if there is *prima facie* evidence of guilt, such as to warrant a trial. In all essential particulars this institution is the same in the United States as in England, but upon minor points there are in practice some differences. The number of men required to constitute a grand jury is not the same in every State, but varies from 12 to 23. The court may, in its discretion, select the foreman or allow the jurymen to do so.

The importance of the grand jury in our legal system is not due to any general impression of its value in the ordinary administration of the criminal law, but to the great rôle which it has played as a bulwark against royal aggression. The Crown in England has always enjoyed the right of instituting criminal prosecutions by information (q.v.), and the abuse of this prerogative was one of the principal grounds of the popular uprising against the Stuarts in England and against George III. in America. It is to this feeling, that only the people should have the power of instituting criminal prosecutions, that we owe the provision in the American Constitution guaranteeing the institution of the grand jury. Most of the State constitutions have provisions to the same effect. See JURY.

GRAND LAKE, or **LAKE CHETIMACHES**, shĕt'ē-mâsh'. A shallow lake of southern Louisiana, surrounded by the parishes of Saint Martin, Iberville, Iberia, Assumption, and Saint Mary (Map: Louisiana, C 4). It is over 40 miles long, and receives the waters of the Atchafalaya River from the north, and those of Lake Vernet and the Grand River at the south, issuing through Myrtle Bayou into Atchafalaya Bay and the Gulf of Mexico.

GRAND LARCENY. See LARCENY.

GRAND LEDGE. A city in Eaton County, Mich., 12 miles west of Lansing; on the Grand River and on the Pere Marquette Railroad (Map: Michigan, J 6). It is a popular summer resort, and has manufactures of sewer-pipe, flour, chairs, canned goods, foundry products, etc. Coal and fire-clay are found in the vicinity. Population, in 1890, 1606; in 1900, 2161.

GRAND MAL, grăn mäl. See EPILEPSY.

GRAND MANAN'. An island of Charlotte County, New Brunswick, Can., off the Maine coast, at the entrance to the Bay of Fundy (Map: New Brunswick, C 5). It is about 20 miles by 5, with abundance of timber and excellent facilities for ship-building. Fishing is the leading occupation of the inhabitants; porpoise-fishing in particular is the specialty of a small settlement of Quoddy Indians at Indian Beach, on the north. The island is traversed with good roads, and has become a favorite summer resort, on account of its varied and picturesque scenery, angling, and shooting, and cool and bracing climate. The United States is represented by a consular agent. Population, 2500.

GRAND MASTER. The title borne by the heads of the great military orders of the mediæval ages, such as the Hospitallers, the Templars, and the Teutonic Knights, and now applied to the highest officials of numerous orders and fraternal organizations.

GRAND MONAD'NOCK. See MONADNOCK, GRAND.

GRAND MONARQUE, grăn mô'närk', LE. One of the many titles of Louis XIV. of France.

GRANDMONTAINS, grăn'môn'tăn', or **GRAMMONT**, ORDER OF. A religious Order in France, founded in 1073 by Saint Stephen of Thiers (died 1124), who, according to the current legend, which has recently been questioned, after receiving his education in Italy, returned to France, and became a rigorous and solitary ascetic. He remained for a long time in a lonely retreat in the Glen of Muret, a short distance east of Limoges; but as the fame of his piety spread his retreat attracted many visitors, and finally a community was formed whose mode of life was characterized by the most severe rules of fasting, silence, and the mortification of the flesh. The Order changed its abode to Grandmont, or Grammont, several miles farther to the east, and from this locality it took its name. The severity of its discipline was relaxed by Innocent IV. and Clement V., in the thirteenth and fourteenth centuries. There was a brief period in which the Order flourished, but during the Revolution it was broken up. The founder, Stephen of Thiers, was canonized by Clement III. in 1189. The annals of the Order were published at Troyes in 1662.

GRANDMOUGIN, grăn'mōō'zhăn', CHARLES (1850—). A French man of letters, born at Vesoul, Haute-Saône. He studied law, and was in the office of the War Minister; but his tastes inclined to poetry, and he published his first volume, *Les siestes*, at the age of twenty-three. Five years later his chief work appeared, *Prométhée*, a drama in verse, and another drama, *Orphée*, was performed in 1887. His stray pieces, collected from the lectures he gave in France and Switzerland, were published (1884-90), in seven different volumes. Besides contributing prose and verse to periodical literature, Grandmougin wrote lyrics and librettos for musical composers —Godard, Massenet, Lefèvre, and others—and was himself one of the first French appreciators of Wagner. He also published *Contes d'aujourd'hui* (1887), and assisted in the literary part of the revival of the old passion plays.

GRAND OLD MAN. A popular name for William Ewart Gladstone (q.v.).

GRAND PENSIONARY. In the days of the Dutch Republic, the State Secretary for the Province of Holland. Until the time of Olden Barneveldt (q.v.), the Grand Pensionary was also Advocate-General for the same province. He had no vote in the Assembly of the States, and could only bring forward subjects for discussion. He, however, collected the votes, wrote the decrees, read the letters addressed to the States, conducted negotiations with foreign ambassadors and ministers, and took charge of the revenues of the province, of its rights and privileges, and whatever else pertained to its welfare. He was a perpetual member of the States-General of the United Netherlands, and thus, as first magistrate of Holland, the most important of the United Provinces, he acquired immense influence over all the Netherlands, and might be considered Premier of the Dutch Parliament. The Grand Pensionary held his office for five years, but was in most cases reëlected. The office was abolished in 1795, after the conquest of the Netherlands by the French.

GRAND-PIERRE, grän'pyâr', Jean Henri (1799-1874). A French Protestant pulpit orator. He was born at Neuchâtel, Switzerland, was educated there and at Tübingen, became pastor of the French Church at Basel (1823), and was an intimate friend of Vinet. In 1827 he went to Paris, became president and professor of languages in the theological seminary, and was soon recognized as one of the most eloquent of pulpit orators. His last twenty years were passed as pastor of l'Oratoire, the greatest of the Protestant churches in the French capital. After the death of Adolphe Monod (1856), he was leader of the orthodox branch of the Reformed Church. Louis Philippe granted him letters of naturalization, and Louis Napoleon made him a member of the Legion of Honor. He visited the United States twice, and in 1850 published *A Parisian Pastor's Glance at America* (Eng. trans. Boston, 1854). He died in Paris, 1874. His sermons on *The Doctrines of the Christian Religion* appeared in London (1844).

GRAND PRÉ, grän prâ. A village in Kings County, Nova Scotia, Can., on the Basin of Minas, 15 miles from Windsor, reached by the Windsor and Annapolis Railroad (Map: Nova Scotia, E 4). Population, in 1900, 874. It is notable as the central scene in Longfellow's *Evangeline*.

GRAND PRIX DE PARIS, grän prê de pâ'rê' (Fr., great prize of Paris). The most important event in the French racing calendar. It corresponds to the English Derby in point of interest and monetary value. The race is run about the middle of June each year, and takes place on the famous race-course at Longchamp, near Paris. Under the Empire the prize was paid for by the city of Paris; but since 1871 two railroads have paid 25,000 francs each, the city of Paris 50,000, and the sum total of the prize in other ways brought up to a total value of 250,000 francs. The race marks the beginning of the summer season in the fashionable world, after which the regular migration to the seaside or country takes place.

GRAND PRIX DE ROME. See Prix de Rome.

GRAND RAPIDS. A city and the county-seat of Kent County, Mich., 30 miles from Lake Michigan, and 60 miles west by north of the State capital, Lansing; on the Grand River, at the head of steam navigation, and on the Michigan Central, the Lake Shore and Michigan Southern, the Pere Marquette, the Grand Rapids and Indiana, the Grand Trunk, and several other railroads (Map: Michigan, H 6). It was settled in 1833, on the site of an abandoned Indian village, and was chartered as a city in 1850. Grand Rapids is the seat of Roman Catholic and Protestant Episcopal bishoprics. It has a number of charitable institutions, among them the Butterworth Hospital, Union Benevolent Association Home and Hospital, Women's Home and Hospital, City Home for the Treatment of Contagious Diseases, Saint Mark's Hospital, Emerson Home, Home for the Aged, Holland Union Benevolent Association Home, and Saint John's Orphan Asylum. Here are also the State Masonic Home and the State Soldiers' Home, and, among other prominent structures, the Young Men's Christian Association Building, the city hall, the County and Federal buildings, Masonic Temple, Pythian Temple, and Elk Hall. The city has also a public library and several public parks.

Grand Rapids is the centre of a region interested largely in agriculture and fruit-growing, has extensive gypsum-quarries in the vicinity, and is an important commercial city, with a large trade in pine and hard-wood lumber, and in manufactured products. The manufacturing industry is facilitated by the water-power furnished by the Grand River, which enters Lake Michigan 40 miles below, and at Grand Rapids it falls about 18 feet, forming the rapids from which the city derives its name. Among the more important manufactures are furniture, lumber products, school seats, flour, carpet-sweepers, calcined plaster, foundry and machine-shop products, carriages and wagons, and agricultural implements.

The government is vested in a mayor, chosen biennially, a unicameral municipal council, and subordinate administrative boards—police, fire, public works, health, poor, and assessors—appointed by the executive. The highway commissioners, city attorney, building inspector, and plumbing inspector are elected by the council; and the city clerk, treasurer, comptroller, and marshal are chosen by popular election. The annual income and expenditures of the city, including the State and county tax, amount to about $2,290,000 and $1,710,000 respectively, the principal items of expense being $55,000 for the operation of waterworks, $85,000 for the police department, $120,000 for the fire department, and $260,000 for schools.

Population, in 1850, 2686; in 1870, 16,507; in 1890, 60,278; in 1900, 87,565; including 23,900 persons of foreign birth and 600 of negro descent.

GRAND RAPIDS. A city and the county-seat of Wood County, Wis., near the centre of the State; on the Wisconsin River, and on the Chicago, Milwaukee and Saint Paul, the Wisconsin Central, the Chicago and Northwestern, and other railroads (Map: Wisconsin, D 4). A fine bridge across the river connects the city proper with Centralia, formerly an independent municipality, but since 1900 included within the limits of Grand Rapids. There is a public library. The city controls large lumber interests, and has

manufactures of lumber, pulp and paper, furniture, flour, etc. The manufactures are promoted by good water-power. Population, in 1890, 1702; in 1900, 4493.

GRAND REMONSTRANCE. A manifesto presented to Charles I. of England by the House of Commons in 1641. The outbreak of the Irish rebellion and the rumored intrigues of the King with the Scotch Earl of Montrose had convinced the leaders of the Puritan party that the hour had come when he must be called to account. Accordingly, on November 22, while Charles was absent in Scotland, the Commons, after a final stormy debate lasting from noon till midnight, adopted a Grand Remonstrance by a majority of eleven. The Remonstrance is in character a severe indictment for a long series of acts of alleged misgovernment extending over the King's whole preceding reign. Some of the charges were exaggerated or untrue. The document, which was presented December 1, consists of 204 sections, and in it the forced loans and ship-money, the billeting of soldiers and the imprisonment of members of Parliament, the enlargement of the royal forests and the abuse of commercial monopolies, the excesses of the courts of Star Chamber, High Commission, and that of the president and Council of the North, with many other grievances, are minutely set forth. As in the Petition, a request is made for the appointment of ministers in whom the Parliament may have confidence, and it is asked that the reform of the Church may be left to a "synod of the most grave, pious, learned, and judicious divines"; but the Parliamentary plan contains no suggestion of toleration for those who shall not conform. When first received from the deputation of the Commons, Charles criticised and ridiculed the Remonstrance. On December 10 he issued a proclamation on religion, which he evidently intended as an indirect reply, and on December 23 he issued a lofty and evasive 'Answer' to the petition which accompanied the manifesto. He seemed blind to the supreme danger of his position, and on January 3, 1641-2, sent his Attorney-General to impeach the leaders of the opposition before the House of Lords. For the text of the Grand Remonstrance, consult Gardiner's *Constitutional Documents* (2d ed., Oxford, 1899), and for a discussion, his *History of England*, x. 59-64, 71-79, 88, 108-09 (new ed., London and New York, 1893-95).

GRAND RIVER. One of the headstreams of the Colorado (q.v.). It rises in the Rocky Mountains, in the northern part of Colorado, and flows in a general southwest course for about 350 miles, joining the Green River in southeastern Utah to form the Colorado (Map: Utah, C 2). Its main tributaries are the Gunnison and Dolores rivers, both from the south. The greater part of its course is through a mountainous region in deep cañons, although there are many fertile valleys along its banks.

GRAND RIVER. A river whose sources are located in Adair and Union counties, Iowa (Map: Iowa, C 3). After a southeasterly course of 300 miles, it flows into Missouri River at Brunswick, Chariton County, Mo.

GRAND RIVER. A tributary of Lake Michigan, rising in Jackson County, Mich., and flowing for about 280 miles northwest and west (Map: Michigan, G 6). It empties into the lake at Grand Haven. It is navigable by steamers 40 miles from its mouth to Grand Rapids, above which place the river falls 18 feet in a mile, furnishing good water-power.

GRAND RIVER, or HA'MILTON RIVER. A river of Labrador, British America (Map: Canada, S 6). It leaves Lake Petitskapow in latitude 54° 35′ N. and longitude 64° 50′ W., flowing south through a chain of lakes and over the Grand Falls (q.v.), then continuing east and northeast until it enters the Atlantic Ocean through Hamilton Inlet.

GRAND SERGEANTY (ML. *magna serjeantia*). The most honorable of the ancient feudal tenures. According to Lyttelton, tenure by grand sergeanty is where a man holds his lands or tenements of his sovereign lord the King by such services as he ought to do in his proper person to the King, as to carry the banner of the King, or his lance, or to lead his army, or to be his marshal, or to carry his sword before him at his coronation, or to be his carver, or his butler, or one of his chamberlains of the receipt of his exchequer, or to do other like services. This tenure must be held directly of the King. Where lands were held of a subject on condition of performance of similar services, the tenure was not grand sergeanty, but knight's service. Thus, lands on the Scottish border held of the King by cornage—i.e. on condition of winding a horn to give notice when the Scots had crossed the border—were held in grand sergeanty; but lands held of a subject for the same service were held in knight's service. Tenants holding by grand sergeanty were free from escuage, which usually appertained to knight's service, and in general could only be called upon to perform their services *infra quatuor maria*, within the four seas. The services in grand sergeanty were to be performed by the tenant in person, where he was able to do so. The office of attendance on the sovereign's person was esteemed so honorable that no one below the dignity of a knight could perform it. Hence, where lands held by grand sergeanty were in the possession of a citizen, he was permitted to perform his service by deputy. This tenure by grand sergeanty was by 12 Charles II., c. 24, in common with other military tenures, reduced to common socage (q.v.); except so far as regards the honorary services, which continue to be observed to this day.

In Scotland, grand sergeanty was not known as a separate tenure—that is to say, lands held on condition of honorary services rendered to the sovereign were not attended with any privileges other than those attaching to lands held in a similar manner of a subject superior. In that country a tenure by honorary service was known as a blanch holding. See FEUDALISM; TENURE.

GRAND TOUR. The term applied in the eighteenth century to the tour of France, Germany, and Italy, which formed a part of the education of young men of wealth and fashion.

GRAND TRIANON, trē'ä'nôn'. See TRIANON.

GRANDVAL, grän'val', MARIE FÉLICIE CLÉMENCE DE REISET, Viscountess de (1830—). A French composer, born at Saint Rémy-des-Monts. She studied with Flotow and Saint-Saëns, and

under various pseudonyms published many songs. Her oratorio, *La fille de Jaire*, won the Prix Rossini, and a number of operas, among them *Piccolino* (1868), *Atala* (1888), *Mazeppa* (1892), have been successfully produced. Her sacred compositions are also of considerable merit.

GRANDVILLE, grän'vēl' (1803-47). A French illustrator and caricaturist. His real name was JEAN IGNACE ISIDORE GÉRARD, and he was born at Nancy, September 3, 1803. In the year 1828 he published the first of a series of humorous sketches, entitled *Les métamorphoses du jour*, which were highly thought of, and in 1840-42 another series, entitled *Les animaux parlants*. His *Convoi de la liberté*, his *Basse cour*, *Mât de cocagne*, etc., as pictures of the politics and manners of the times, are of great and lasting value. When the September laws put an end to political caricature, Grandville used his pencil to satirize the follies and vices of mankind. He also contributed illustrations to new and splendid editions of the *Fables* of Lafontaine and Florian; the *Adventures of Robinson Crusoe; Gulliver's Travels;* Hugo's *Vie de Napoléon;* Raybaud's *Jérôme Paturot*, etc. Grandville is remarkable for depth and delicacy of observation and criticism, for his ingenious turn of thought, and accuracy in portraiture. His drawing is correct, his anatomy accurate, his foreshortening carefully studied; the whole is occasionally hard and cold, the idea complicated. Consult Blanc, *Grandville* (Paris, 1855).

GRANEL'LA, VICTOR. The pseudonym of the German theologian Wilhelm Tangermann (q.v.).

GRANET, grä'nā', FRANÇOIS MARIUS (1775-1849). A French painter, born at Aix, in Provence. He was a pupil of the landscape artist Constantin, and then studied under David. In 1802 he went to Italy, and remained in Rome much of his life. While he attempted historical subjects at times, Granet was distinctly a painter of interiors, and in this genre achieved a reputation. In 1826 he was made custodian of the paintings of the Louvre. At his death he left his fortune to found a museum at Aix. His works include: "Eglise souterraine d'Assise" (1823); "Intérieur de l'église des Capuchins à Rome" (1819); "Prise d'habit au couvent de Saint-Claire à Rome;" and "Le Tasse visité dans sa prison par Montaigne."

GRANGE. The name popularly applied to the Patrons of Husbandry, but in fact denoting the constituent and subsidiary lodges of that organization. The Society of Patrons of Husbandry was founded at Washington, D. C., in December, 1867, to advance the interests of husbandry. The chief founder of the society was O. H. Kelley, a clerk in the Department of Agriculture, deputed by the Government in 1866 to make a tour of inspection through the Southern States, and to report upon their agricultural conditions and the best means of improving them. The widespread demoralization of the farming population there convinced Kelley that organization was vitally necessary, as well for the farmers' self-protection as for their advancement by the use of scientific methods of cultivation and the enactment of laws favorable to them. Upon his return to Washington, therefore, he, with six others, established the 'National Grange of Patrons of Husbandry.' The other founders were William Saunders, J. R. Thompson, A. B. Gresh, F. M. McDowell, L. M. Trimble, and William M. Ireland. The organization was secret, and membership was limited to those actually engaged in agriculture. Women were admitted on an equality with men; and this feature, novel at that time, had much to do with the society's rapid growth. The constitution provided for local, district, State, and national organizations, for the conferring of degrees, and for the election of women to office. Aided by the efforts of Kelley, who was a zealous promoter, the society, after a few years, gained rapidly in numbers and influence. In 1873 there were 13,000 subordinate granges, and in 1875 the total membership reached 1,500,000. At about this time the Grange had become prominently identified with legislative measures, both State and national, intended to curb railroads and trusts, to prevent discrimination in rates and prices, and in other ways, not always justifiable, to advance the farmers' interests. Although supposedly a non-partisan and non-political order, a good deal of 'wildcat' legislation was laid at the Grange's door, and eventually brought it into disrepute. In the meantime, however, it had been largely instrumental in securing the passage of the Interstate Commerce Act, the Oleomargarine Law, the Hatch Act, founding experiment stations, and the law making the head of the Department of Agriculture a Cabinet officer. The Grange also endeavored to gain control of elevators, warehouses, and terminal facilities, and instituted co-operative buying and selling on a large scale for the advantage of its members. The public, not easily distinguishing the official acts of the Grange from the efforts and purposes of the farmers generally, came to designate the whole class as *Grangers*, and their legislative ends as the *Granger Movement*. Doubtless from this derived meaning also came the term *Granger roads*, applying to the principal railroads carrying grain and wheat. Of late years the political activity of the Grange has practically ceased; or, more properly, it has been successively transferred to the Farmers' Alliance (q.v.) and to the Populist Party (q.v.). On the other hand, the social aspects of the Grange have been more largely developed, and it promises, though with a smaller membership than it once had, to remain a permanent institution. Consult: *Popular Science Monthly*, vol. xxxii.; *American Annals of Political Science*, vol. iv.; *New Jersey Labor Statistics* for 1886.

GRANGEMOUTH, grānj'mŭth. A seaport town and police burgh in Stirlingshire, Scotland, on the Firth of Forth, at the mouth of the Carron, 2½ miles northeast of Falkirk (Map: Scotland, E 3). It has a fine harbor with good docks, and carries on a large Continental and coasting trade, its situation at the entrance to the Forth and Clyde Canal adding to its importance. The average annual value of its imports and exports, exceeding £5,500,000 ($27,500,000), gives it third place among Scottish ports. There are shipbuilding and supplemental industries, iron, brick, and tile-works, and coal-mining. Population, in 1831, 1155; in 1901, 8000.

GRAN'GER, FRANCIS (1792-1868). An American politician, born at Suffield, Conn., the son of Gideon Granger (q.v.). He graduated at

Yale in 1811, and in 1814 began the practice of law with his father in Canandaigua, N. Y. In 1825 he was elected from Ontario County to the State Legislature, and with William H. Seward, Thurlow Weed, and others, took a prominent part in the Anti-Masonic movement. In 1826 he was reëlected to the Legislature, and in 1827 was a delegate to the famous protectionist convention at Harrisburg, Pa. In 1828 he was nominated by the Anti-Masonic Party for Governor, but declined, as he had accepted the nomination of the Adams Democrats for Lieutenant-Governor on their ticket. He was one of the most active promoters of the new Whig Party in 1834, and in the State convention of that year was one of its candidates for the nomination as Governor, which, however, was secured by Seward. In the fall of the same year he was nominated and elected to Congress. Granger was reëlected to the Twenty-sixth Congress in 1838, and in March, 1841, entered Harrison's Cabinet as Postmaster-General, the office his father had held under Jefferson and Madison. He was confirmed after some objection on the part of the Southern Senators, who suspected him of anti-slavery proclivities; but after Harrison's death and the break between Tyler and the Whigs, he resigned. He again served in Congress in 1841-42, but at the end of his term retired, and never again held public office. He continued to take an active interest in politics, however, supported Webster in his stand on the compromise measures of 1850, and headed the revolt in the Whig convention at Syracuse, N. Y., in that year, the participators in which are said to have taken their name of 'Silver Grays' (q.v.) from the flowing white locks of Granger and some of his conservative companions. He was in sympathy with the Know-Nothing movement in 1853-56, and is said to have advised its leaders; but he never supported it openly. In 1861 he was a member of the Peace Convention at Washington.

GRANGER, Gideon (1767-1822). An American politician, for thirteen years Postmaster-General of the United States. He was born at Suffield, Conn.; graduated at Yale in 1798, studied law and was admitted to the bar, and was elected to the Connecticut Assembly, where he became one of the most influential Anti-Federalist leaders in the State. He is said to have originated the Connecticut school fund. When Jefferson was elected to the Presidency he recognized the necessity of revolutionizing the Federalist character of New England, and with this end in view, in 1801 appointed Levi Lincoln Attorney-General, Henry Dearborn Secretary of War, and Gideon Granger Postmaster-General. The last was not then a Cabinet officer, but his patronage was exceedingly large, and there was no requirement that his appointments be confirmed by the Senate. Granger's position enabled him to keep in touch with political affairs in every part of the country, and his principal services to Jefferson were of a personal nature in apprising him of the machinations of the politicians, and the trend of popular feeling. It was he who, in 1804, scented Burr's conspiracy with the Federalists. In the same year, while retaining his Federal office, he became agent for the New England Mississippi Company, and openly lobbied for the compromise of the Yazoo Claims on the floor of the House. Granger continued to hold office under Madison until 1814, when his alliance with the Giles-Leib faction, and his appointment of Leib as postmaster at Philadelphia, in the face of the President's opposition, led to his removal from office. Later he settled in New York, where he served several terms in the Legislature, and became a follower of De Witt Clinton.

GRANGER, Gordon (1822-76). An American soldier, born in Wayne County, N. Y. He graduated at West Point in 1845, and was an officer in General Scott's army during its campaign from Vera Cruz to the City of Mexico. He was given the brevet rank of captain for his services during the Mexican War, and at its conclusion was assigned to duty on the southwestern frontier. At the outbreak of the Civil War he was sent to Ohio to muster in volunteers, but soon afterwards was ordered to southern Missouri, where he was engaged in several actions. During the early part of April, 1862, he commanded the Third Brigade of the Army of the Mississippi at the capture of Island Number 10, and during the following campaign he commanded the cavalry in the Army of the Mississippi. At the battle of Chickamauga the next year he commanded the reserve. He commanded the Fourth Corps in the battle of Missionary Ridge, and was then sent to the relief of Knoxville. During the last two years of the war he was engaged in the military operations in the Gulf States, which finally terminated in the capture of Mobile. On January 15, 1866, he was mustered out of the volunteer service with the rank of major-general of volunteers, and the brevet rank of major-general in the Regular Army, and in the following July he was commissioned colonel of the Twenty-fifth Infantry.

GRANGER, James (1723-76). An English biographer, print-collector, and preacher. He was entered at Christ Church, Oxford, in 1743, but took no degree. Having taken orders, he received the living of Shiplake, Oxfordshire. He was liberal in politics, and brought on himself the wrath of Dr. Johnson for a Whig in orders. In 1773, with Lord Mountstuart, later Earl of Butte, he toured Holland, and made great addition to his store of portraits. He died of apoplexy, which seized him while he was administering the sacrament. His main work is *Biographical History of England . . . Adapted to a Methodical Catalogue of Engraved British Heads, with a preface, showing the utility of a collection of Engraved Portraits* (last ed. 1824). This work, continued by the Rev. Mark Noble, gave rise to the mutilation of books containing engraved portraits for the purpose of superillustration, and to the terms 'grangerism' and 'grangerize' therefor. Two of Granger's sermons were published: *An Apology for the Brute Creation* (1772), and *The Nature and Extent of Industry* (1775). Granger's letters, "composing a copious history and illustration of the biographical history of England," were edited by J. P. Malcolm (1805).

GRANGER, Robert Seaman (1816-94). An American soldier, born in Zanesville, Ohio. He graduated at West Point in 1838, and served in the Seminole and Mexican wars, in which he attained the rank of captain. On April 27, 1861, he was captured by the Confederates with Major Sibley's command on the coast of Texas, was released on parole, and was not exchanged until August, 1862. On October 20, 1862, he was made brigadier-general of volunteers. In 1864

he took part in the capture of General Roddy's camp near Courtland, and later aided in driving General Wheeler from middle Tennessee. In October of the same year he was engaged in protecting that district during Forest's raid, and in the defense of Decatur against Hood's army. He was brevetted major-general in the Regular Army on March 13, 1865, and soon afterwards was commissioned lieutenant-colonel of the Eleventh Infantry. In 1871 he was promoted to the rank of colonel, and in 1873 was retired from active service upon his own application.

GRANGER CASES. A series of cases decided by the Supreme Court of the United States in 1876, and reported in 94 United States Reports at pages 113 to 187, inclusive. Their several titles are as follows: Munn *vs.* Illinois; Chicago, Burlington and Quincy Ry. *vs.* Iowa; Peik *vs.* Chicago and North Western Ry.; Chicago, Milwaukee and Saint Paul Ry. *vs.* Ackley; Winona and Saint Peter Ry. *vs.* Blake; and Stone *vs.* Wisconsin. In his dissenting opinion, Mr. Justice Field designated the entire group as the 'Granger cases,' a name which has clung to them ever since, although neither the Patrons of Husbandry, nor any 'grange' or lodge of that association, nor any of its members or 'grangers' had any connection with these litigations.

The general principle deducible from these decisions has been stated in these words: "Whenever any person pursues a public calling, and sustains such relations to the public that the people must, of necessity, deal with him, and are under a moral duress to submit to his terms, if he is unrestrained by law, then, in order to prevent extortion and an abuse of his position, the price he may charge for his services, or use of his property, may be regulated by law." Applying this principle to the cases then before the court, it was held that a statute of Illinois was constitutional which prescribed maximum rates for the storage of grain in elevators, and prescribed penalties for charging higher rates than those named in the law. In the various railroad cases the court held that railroad companies are engaged in a public employment; that their property is thereby "affected with a public interest, and no longer *juris privati* only"; that it has been devoted by them to a use in which the public has an interest; that by such conduct they have in effect granted to the public an interest in that use, and must submit to be controlled by the public for the common good, to the extent of the interest thus created; that they may withdraw their grant by discontinuing the use, but that so long as they maintain the use they must submit to the control.

The doctrine of these cases has been approved by many State courts. In Maine it was applied in sustaining the constitutionality of a statute prescribing the maximum tolls to be charged by the owner of a public gristmill. The court in that case said: "In the absence of Government aid, the individual proprietor, not pretending to serve the public, might maintain such mills as private mills, free from legislative interference, precisely as he might maintain a store, shop, or other private business; but when he makes his mill public and attempts to serve the public, then he dedicates his mill to public use, and it becomes subject to public regulation and control."

It is admitted by all courts that the doctrine of the Granger cases does not authorize the legislature to destroy or confiscate property, even when it is affected with a public use, under guise of regulating rates or tolls. Statutes imposing unreasonable regulations, or having the object of taking private property for public use without compensation, have been declared unconstitutional. Consult Hare, *American Constitutional Law* (Boston, 1889).

GRANGERS. See GRANGE.

GRANGOUSIER, grän'goo'zyā'. In Rabelais's *Gargantua and Pantagruel*, the King of Utopia and father of Gargantua, supposed to stand in the political allegory for Jean d'Albret.

GRANI'CUS (Lat., from Gk. Γράνικος, *Granikos*). The ancient name of a small river in Troas, in the northwest of Asia Minor, flowing from the northern side of Mount Ida to the Propontis, and now known as the Kodja-su. The Granicus is celebrated as the scene of the first victory gained by Alexander the Great over the Persians after he crossed the Hellespont, B.C. 334, and of a victory by Lucullus over Mithridates in B.C. 74.

GRANIER DE CASSAGNAC, grā'nyā' de kā'sā'nyāk', ADOLPHE (1808-80). A French Bonapartist and journalist, born in Averon-Bergelle. He went to Paris in 1832. His first work was as a literary critic. He enthusiastically espoused the cause of the Romanticists, and his attack on Racine stirred up all Paris. He abandoned literature for politics in 1840, in which year he made a political voyage to the Antilles. In 1845 he started the ultra-Orleanist journal *L'Epoque*. After the Revolution of 1848 he left Paris. He returned in 1850 as a Bonapartist, and became editor of the *Pouvoir*. During the Empire he was a Bonapartist member of the French legislative body, and a passionate Conservative. In 1857 he founded with Barbey d'Aurevilly the short-lived *Le Réveil*. He was connected with other journals in the interest of Napoleon, becoming, in 1866, the editor-in-chief of the violent *Le Pays*, with his son Paul as assistant. His polemical career during this decade was marked by sensational duels, lawsuits, affairs with the police, and other evidences of indiscreet zeal. After the fall of the Empire he started *Le Drapeau* in Brussels. In 1876 he was once more chosen as an anti-republican national Deputy. He died January 31, 1880. His works include two mediocre novels; also travels (*Voyage aux Antilles*); and his *Souvenirs du Second Empire*. His most noteworthy compilations are his histories: *Histoire des classes ouvrières et des classes bourgeoises* (Paris, 1837); *Histoire du Directoire* (1851-63); *Histoire des Girondins et des massacres de septembre* (1860), etc. They lack calm judicial qualities and the result of impartial study and investigation, but are characterized by journalistic vigor and graphical power.

GRANIER DE CASSAGNAC, PAUL (1843 —). A French author and journalist, born in Paris, son of the preceding. He began his literary life by writing for *Le Pays*. He took part in the war of 1870-71, and then returned to journalism. In 1874 *Le Pays* was suspended on account of M. de Cassagnac's violent articles. In 1876 he was elected to the Chamber of Deputies; and he has since continued to serve there with occasional interruptions. He is known as one of the bitterest opponents of the existing order of

things in France. After the death of the Prince Imperial in 1879, De Cassagnac supported Prince Victor Napoleon, and to assist his imperialistic ideas founded a new journal, *L'Autorité*. His aggressive temperament and caustic pen have involved him in numerous duels. He wrote in collaboration with his father *Histoire populaire abrégée de Napoleon III.* (1874-75). His own works include: *Empire et royauté* (1873), and *Mémoires de Chislehurst* (1873).

GRANITE (It. *granito*, granite, grained, from *granire*, to reduce to grains, from *grano*, Lat. *granum*, grain; connected with Goth. *kaúrn*, Icel., OHG. *korn*, Ger. *Korn*, grain, AS., Eng. *corn*). An igneous rock or family of rocks characterized by acid composition and granitic texture (see IGNEOUS ROCKS), containing the minerals quartz and potash feldspar, and usually, also, either light or dark mica, or both, together with hornblende or augite. Other minerals are usually present in less abundance, as lime-soda feldspar, magnetite, ilmenite, sphene, zircon, etc. The average composition of granite is as follows: Silica, 70 per cent.; alumina, 15 per cent.; sesquioxide and protoxide of iron, 4 per cent.; magnesia, 1 per cent.; lime, 2 per cent.; oxide of sodium, 4 per cent.; oxide of potassium, 4 per cent. The texture of granite, which gives its name to the texture of a considerable group of rock types, consists in a mosaic of interlocking crystalline grains representing an essentially uninterrupted period of crystallization.

Granites are classified into muscovite granite or alkali granite, muscovite-biotite granite or binary granite, hornblende granite, and augite granite, the first portion of the name generally indicating the mineral or minerals which with quartz and potash feldspar make up a large part of the rock's substance. By loss of the constituent mineral quartz granite grades into syenite (q.v.); by reduction of the amount of potash feldspar and gain in the proportion of lime-soda feldspar it passes into diorite (q.v.). Augite diorites by a similar change pass into gabbro. These transitions are mentioned not alone to show the relationships which exist between the different families of igneous rocks possessing granitic texture, but because they indicate transitions frequently observable within the same rock mass. Important variations in the relative proportions of the several mineral constituents of a rock within the same mass are, in fact, the rule rather than the exception, so that it is difficult to delimit with any sharpness the several types.

In an earlier period of development of the science of geology, the question respecting the origin of granites was debated with great warmth by the rival schools of England and Germany. Hutton (q.v.) and his followers maintained that granites were formed from fusion and consolidation, whereas Werner and the Freiberg school of geologists, with even greater assurance, advocated the chemical precipitation theory of its formation. Time has shown the correctness of the view held by Hutton, though his theory has been modified in important ways. It was long a tradition that granite and rocks of granitic texture generally were all produced in the earlier geological ages, conditions necessary to their formation being assumed to have been attained which have not since been reproduced. This view was a natural one, since none of the granites then known was as young as the Tertiary age. When later granites were discovered which had been formed in the Tertiary or post-Tertiary periods, a different explanation became necessary. The view then became general that the special conditions which are necessary for the formation of granite obtain only at considerable depths below the surface of the earth, and that granites of recent formation are only rarely found because, except under unusually favorable conditions, a long time interval is necessary to allow the forces of erosion and transportation to remove the rock cover under which they are buried. The granites which are now forming at great depths will in a future age be so far dissected as to appear at the surface.

In common usage the term granite is loosely applied to any rock of granitic texture, and among petrographers the term is sometimes used in a broad family sense to cover rocks of porphyritic texture but similar chemical composition, namely, rhyolites (q.v.) and rhyolite porphyries.

Granite is an important building-stone. It is much harder to quarry and tool than are sandstone, limestone, and marble, but has greater strength; the best grades are extremely resistant to weathering. Consult: Kemp, *Handbook of Rocks* (New York, 1900); Rosenbusch, *Mikroskopische Physiographie der Mineralien und Gesteine* (Stuttgart, 1896). See BUILDING-STONE.

GRANITE STATE. New Hampshire. See STATES, POPULAR NAMES OF.

GRANITIC TEXTURE. See IGNEOUS ROCKS.

GRA'NIUS LICIN'IA'NUS. A Roman historian of the second century A.D. Fragments of his works were found in 1853 on a Syrian palimpsest by Paul de Lagarde. It was deciphered and published by Pertz, as *Grani Liciniani quæ Supersunt* (1857), and again in 1858 by seven professors at Bonn, the *Editio Philologorum Bonnensium Heptas*. The original work, of which Madvig thinks this an excerpt, dates from the second century. Consult Dieckmann, *De Granii Liciniani Fontibus et Auctoritate* (Berlin, 1896).

GRANMICHELE, grän'mē-kā'lā. See GRAMMICHELE.

GRANNY KNOT. See KNOTTING AND SPLICING.

GRAN SASSO D'ITALIA, grän säs'sō dē'tā-lē'ä (It., Great Rock of Italy). A group of mountains in Central Italy, the highest of the Apennines, having their greatest height in Monte Corno (9580 feet) (Map: Italy, H 5). The Gran Sasso can be ascended without great difficulty in summer and autumn from Aquila, and less conveniently from Teramo, but in spring the snow makes climbing difficult. At Campo Pericoli (7220 feet) is a refuge built by the Italian Alpine Club, which has also published a special map of the locality. Consult Abbate, *Guida al Gran Sasso d'Italia* (Rome, 1888).

GRANT (OF. *grant, graunt, creant, crant*, from Lat. *credere*, Skt. *śraddhā*, to trust; probably influenced by folk etymology with OF. *garantir*, to guarantee). In English and American law, the conveyance of real property by deed. Originally the term grant was confined to the conveyance of incorporeal hereditaments, such as easements, profits *à prendre*, and future estates

(q.v.), which, not being of a tangible character, were not capable of being transferred by the common law mode of livery of seisin, by which corporeal interests were conveyed. The former were accordingly said to 'lie in grant,' whereas the latter lay 'in livery.' (See FEOFFMENT; LIVERY OF SEISIN.) In order to complete the conveyance of a reversion or remainder by grant, it was necessary that the tenant of the particular estate should acknowledge the grantee by attornment (q.v.). A grant was always effected by a deed. The deed of grant was the simplest of all deeds. When conveyance by livery of seisin was abolished, the grant was generally substituted as the mode of creating or conveying real estate, whether corporeal or incorporeal. This tendency to the substitution of a simple deed for the more ceremonious forms of conveyance of the older law was favored by the provision of the Statute of Frauds, which required all conveyances of land to be in writing. At the present time the deed of grant is generally authorized by statute in England and the United States, though it is usually provided that deeds of bargain and sale and of lease and release may also be used. See CONVEYANCE; DEED.

GRANT, Sir ALEXANDER (1826-84). An English writer and principal of Edinburgh University, eighth Baronet of Dalvey. His father had married while in the West Indies, and Sir Alexander was born in New York, but was sent to England for his education. He distinguished himself at Harrow and Oxford, and studied for the bar, but began literary work with a text-book, *The Ethics of Aristotle* (1857). Two years later he married the daughter of Professor Ferrier, of Saint Andrews, and went to India, where he made his mark as an educator, eventually becoming vice-chancellor of Bombay University and director of public instruction for that presidency. In 1868 he returned to Britain and was elected principal of the University of Edinburgh, which at once felt the influence of his energetic public spirit. His largest work is *The Story of the University of Edinburgh During Its First Three Hundred Years* (1884), but a number of his lectures have been published, and he wrote articles upon educational subjects for the leading reviews.

GRANT, ANNE (MACVICAR), best known as 'Mrs. Grant of Laggan' (1755-1838). A Scotch writer. She was born in Glasgow, the daughter of Duncan MacVicar, a British officer, who was stationed in 1758 at Albany, N. Y. There she became a favorite with the Schuylers and other prominent families, and remained until 1765, when her father settled on a grant of land in what is now Vermont. Three years later they returned to Scotland, secure as they supposed in the possession of the American estate. This, however, was confiscated during the Revolution, and the family was dependent upon the father's pay as barrack-master at Fort Augustus. Anne married the Rev. James Grant, chaplain of the fort, and subsequently minister of Laggan. Left a widow in destitute circumstances, she published, by subscription, a volume of *Poems* (1803), which was well received, and another work entitled *Letters from the Mountains* (1806), which was exceedingly popular. In the United States she is best known by her *Memoirs of an American Lady, with Sketches of Manners and Scenery in America* (1808), which was republished with a memoir by J. G. Wilson in 1876. It gives an interesting account of manners and customs in northern New York before the Revolution. She also published *Essays on the Superstitions of the Highlanders of Scotland* (1814). In 1826 Scott, MacKenzie, and other friends procured for her a pension of £100 a year. Consult *Memoir and Correspondence of Mrs. Grant of Laggan,* edited by her son, J. P. Grant (3d ed., Edinburgh, 1853).

GRANT, ASAHEL (1807-44). An American foreign missionary. He was born at Marshall, N. Y., August 17, 1807; studied medicine at Pittsfield, Mass., and practiced in Utica, N. Y. In 1835 he went as missionary of the American Board to Persia, settled at Urumiah, and did much work among the Nestorians there and elsewhere. He died in Mosul, Turkey, April 24, 1844. For his life, consult Lathrop (New York, 1847), and Laurie, *Grant and the Mountain Nestorians* (Boston, 1853).

GRANT, CHARLES, Lord GLENELG (1778-1866). A British politician. He was the son of Charles Grant, a director of the East India Company, and was born at Kidderpore in Bengal, October 26, 1778. He was educated at Magdalene College, Cambridge, and in 1807 was admitted to the bar, but never practiced. In 1811 he was elected to Parliament from Inverness and remained a member of the House of Commons till 1835, when he was raised to the peerage as Baron Glenelg. He was one of the lords of the treasury from 1813 to 1819, becoming, in the latter year, Secretary for Ireland. From 1823 to 1827 Grant was vice-president of the Board of Trade, and from 1830 to 1834 president of the board of control of the East India Company. In 1835 he was made Colonial Secretary, and held this office until 1839, displaying, however, such remarkable inefficiency as to arouse the opposition of even his fellow Ministers, whose insistence led to his resignation. The disturbed condition of Canadian politics during this period, culminating in the Rebellion of 1837 (see CANADA), was attributed largely to his vacillating policy. Grant was, nevertheless, an accomplished speaker, and in the management of Irish and Indian affairs had shown much ability. He died at Cannes, France, April 23, 1866.

GRANT, DIGBY. A society villain, in Albery's *The Two Roses;* a rôle often successfully played by Henry Irving.

GRANT, Sir FRANCIS (1803-78). A Scotch portrait painter. He was born in Edinburgh, January 18, 1803, and received his education at the Harrow School, with the intention of entering the bar. In 1828 he relinquished his profession and began painting. His only art instruction consisted of twelve drawing lessons from the human figure, his chief knowledge having been gained by copying the works of Velazquez and other great masters. He became a fashionable portrait painter of his day, painting Queen Victoria, the Prince Consort, and many other well-known personages. His portraits are characterized by elegance and refinement rather than by individuality and character. In 1851 he was elected member of the Royal Academy; in 1866, president, soon after receiving the honor of knighthood. He died at Melton Mowbray, October 5, 1878.

There are 253 paintings recorded from 1834 till his death. The most important are as follows: "Breakfast Scene at Melton" (1831-34); "His Majesty's Staghounds on Ascot Heath" (1837), owned by the Earl of Chesterfield; "Melton Hunt" (1839), owned by the Duke of Wellington; "A Shooting Party at Rawton Abbey," owned by the Earl of Lichfield; "The Cottesmore Hunt" (1848); "Queen Victoria Riding with Lord Melbourne and Others in the Windsor Park" (1840); "Lady Glenlyon" (1842); an equestrian portrait of Queen Victoria and the Prince Consort, in Christ's Hospital, London; "Duke and Duchess of Beaufort;" "Earl Russell;" "Earl of Beaconsfield;" "Dr. Sumner, Archbishop of Canterbury;" "Marchioness of Waterford;" "Dr. Moberly, Bishop of Salisbury." In the National Portrait Gallery, London, there is a study for a portrait of Lord Macaulay, and a pen-and-ink sketch of Sir Edwin Landseer, and in the National Portrait Gallery of Scotland, a portrait of Sir Walter Scott.

GRANT, Frederick Dent (1850—). An American soldier, a son of Gen. Ulysses S. Grant, born in Saint Louis, Mo. As a mere child he was with his father during several battles of the Civil War. He graduated at West Point in 1871, and was assigned to the Fourth Cavalry. He served under General Sherman in the expeditions against the Indians from 1873 to 1879, and in 1881 resigned from the army. He was United States Minister to Austria under President Harrison, and police commissioner of New York from 1895 to 1897. At the beginning of the Spanish-American War he reëntered the army as colonel of the 144th New York Volunteer Infantry, and in 1898 was appointed brigadier-general United States Volunteers. During the war he served in Puerto Rico and in the Philippine Islands, and he was afterwards put in command of the military district of San Juan and for almost two years was in command of the district of Cavite and Northern Luzon, P. I. In 1902 he was placed in command of the Department of Texas.

GRANT, George Monro (1835-1902). A Canadian author, orator, and educationist, born at Albion Mines, N. S. He graduated at Glasgow University (1857), entered the ministry of the Presbyterian Church, and undertook a pastoral charge in Halifax, N. S., from 1863 to 1877. It was during this time that he wrote his first book, *Ocean to Ocean* (1873). In 1877 he was made doctor of divinity, and left his Halifax church to be principal of Queen's University, Kingston, Ont. Already famed as a preacher and as an advocate of the union of British America into the Dominion of Canada, he became a forcible and eloquent speaker upon both ecclesiastical and national politics, and used his great influence in promoting the union of the Presbyterian churches and in propagating the imperialist sentiment among the rising generation. He wrote, in the same cause, *Advantages of Imperial Federation* (1889), and *Our National Objects and Aims* (1890). Some of his lectures and sermons have been published; but they lack the personal magnetism of the man, though his *Religions of the World in Relation to Christianity* (1894) evidences his breadth of mind.

GRANT, James (1720-1806). A British soldier, born at Ballindalloch, Banffshire, Scotland. He obtained a commission in the English Army in 1741, and participated in campaigns in Flanders (1747-48), and later in Ireland. At the outbreak of the French and Indian War he came to America as a major. He was defeated in an attempt to reconnoitre Fort Duquesne in 1758; was made Governor of East Florida in 1760, and a year later led expeditions against the Cherokee Indians. During the Revolutionary War he participated in the battles of Long Island, Brandywine, and Germantown. In 1796 he was made a general.

GRANT, James (1822-87). A Scottish author, born in Edinburgh. After a six years' life in Newfoundland, where his father had a military command, he returned to England in 1839, and in 1840 became an ensign in the Sixty-second Regiment. In 1843 he left the service, and spent several months in the office of an architect. His literary tastes soon led him to writing, and in 1845 appeared his first novel, *The Romance of War*. His industry was unflagging, and, besides his historical writings, he published more than fifty works of fiction. They have all a military or an historical setting, and are full of color and movement. He founded and was the secretary of the National Association for the Vindication of Scottish Rights, and attained a reputation for wide military knowledge, which often led to consultation with Government authorities. His works on history include: *Memoirs of the Castle of Edinburgh* (1850); *Memoirs of Montrose* (1858); *The Cavaliers of Fortune, or British Heroes in Foreign Wars* (1859); *British Battles on Land and Sea* (1873); *Illustrated History of India* (1876); *Old and New Edinburgh* (1880); *History of the War in the Soudan* (1885-86); *Scottish Soldiers of Fortune* (1889). His most recent novels are: *Playing with Fire* (1887); *Love's Labor Won* (1888).

GRANT, Sir James Alexander (1830—). A Canadian physician. He was born in Inverness-shire, Scotland, but was brought by his parents to Canada when he was only one year old. He graduated in medicine at McGill University in 1854, began the practice of medicine at Ottawa soon afterwards, and in 1869 became consulting physician to the Governor-General, Monk, a position which he continued to hold under Lord Monk's successors. He was a prominent member of the Dominion Parliament from 1865 to 1873, and again from 1892 to 1896, and in 1872 introduced the original bill for the construction of the Canadian Pacific Railway.

GRANT, James Augustus (1827-92). An African explorer, born at Nairn, in Nairnshire, Scotland. He was educated at Marischal College, Aberdeen, and in 1846 entered the army in India, where he saw active service, and was wounded during the relief of Lucknow. He met John H. Speke (q.v.) in 1847, and the similarity of their tastes drawing them to each other, Speke cordially accepted Grant's offer to accompany him when he set out on his second African journey in 1860. Speke retained undivided command of the expedition, so that to him the credit due a commander must be given; but Grant's loyalty, unselfishness, and enthusiasm contributed in large measure to its success, and his notes and collections proved of the greatest value. In 1868 he took part in the Abyssinian expedition, and in May of the same year retired from the army

with the rank of lieutenant-colonel. He published the record of his experiences under the title *A Walk Across Africa* (1864).

GRANT, Sir James Hope (1808-75). A British soldier, born in Perthshire, Scotland. He served through the first Chinese War, and then went to India, where he took part in the Sutlej campaign of 1845-46, and the Punjab campaign of 1848-49. During the Sepoy Mutiny (1857-58) he bore a conspicuous part in many of the more important engagements, notably the battle of Cawnpore, the storming of Delhi, and both the first and the second reliefs of Lucknow—services which earned him the rank of major-general. At the outbreak of the second Chinese War, in 1860, he was given command of the British forces, and in spite of the lack of co-operation on the part of the French, brought the struggle to a successful conclusion by the capture of Peking. The next year he was raised to the rank of lieutenant-general, and in 1862 was made commander-in-chief at Madras. In 1870 he was appointed commander of the camp at Aldershot, where, in spite of bitter opposition, he succeeded in introducing the Prussian system of army manœuvres. He was a patron of Lord Wolseley, whose ability he was one of the first to recognize, and to whose radical schemes he often lent his influence.

GRANT, Sir Patrick (1804-95). A British soldier. He was born in Scotland; entered the military service of the East India Company in 1820, and served for many years with distinction in India. In 1856 he was appointed commander-in-chief of the Madras Army, and in 1857, at the outbreak of the mutiny, he was temporarily placed in command of all the British forces in India. It was he who sent Havelock to the relief of Cawnpore and Lucknow. He was Governor of Malta from 1867 to 1872, was appointed governor of Chelsea Hospital in 1874, and in 1883 was promoted to be field-marshal.

GRANT, Robert (1852—). An American novelist and essayist, born in Boston. He graduated at Harvard in 1873, received the doctorate of philosophy in 1876, and graduated from the Harvard Law School in 1879. In 1893 he was appointed judge of the Probate Court and of the Court of Insolvency, for Suffolk County, Mass. His early literary work was trivial or juvenile: *The Little Tin God on Wheels* (1879); *The Confessions of a Frivolous Girl* (1880); *The Lambs* (1882); etc. Of more maturity are: *The Carletons* (1886); *An Average Man* (1884); *The Knave of Hearts* (1886); *A Romantic Young Lady* (1886); *Face to Face* (1886); *The Bachelor's Christmas, and Other Stories* (1895); and *Unleavened Bread*, the latter a powerful and popular novel (1900), and by far the best of his fiction. Genial essays on social topics are gathered under the titles: *The Opinions of a Philosopher* (1883); *Reflections of a Married Man* (1892); *The Art of Living* (1895).

GRANT, Robert (1814-92). A Scottish astronomer, born at Grantown-on-Spey, Morayshire. He studied for a short time at King's College, Aberdeen; became connected with a London counting-house, and from 1845 to 1847 was in Paris attending the lectures of Leverrier and Arago, and making researches preparatory to his *History of Physical Astronomy from the Earliest Ages to the Middle of the Nineteenth Century* (1852), a work for which the gold medal of the Royal Astronomical Society was awarded in 1856. In 1859 he was appointed professor of astronomy and director of the observatory in the University of Glasgow. He accompanied the Himalaya expedition of 1860 to Spain to observe the total solar eclipse. His further publications include a valuable *Catalogue of 6415 Stars for the Epoch 1870* (1883), with a *Catalogue of 2156 Stars* (1892), in supplement; and translations of the *Notices biographiques* (as *Biographies of Distinguished Scientific Men*, 1854), and *Sur les comètes* (as *Popular Treatise on Comets*, 1861), of Arago. From 1852 to 1860 he also edited the *Monthly Notices* of the Royal Astronomical Society, of which he was elected fellow in 1850.

GRANT, (Hiram) Ulysses Simpson (1822-85). A celebrated American general, and the eighteenth President of the United States. He was born at Point Pleasant, Clermont County, Ohio, April 27, 1822, and was the eldest child of Jesse R. Grant, a tanner and farmer, and Hannah Simpson Grant. On his father's side he was remotely of Scottish ancestry, being a descendant of Matthew Grant, one of the settlers of Windsor, Conn., in 1635, and a man of much importance in the infant colony, which he served for many years as surveyor and town clerk. Ulysses's great-grandfather, Noah Grant, held a military commission in the French and Indian War, and his grandfather, also named Noah, fought in the Revolution, afterwards emigrating to Pennsylvania, and from thence to Deerfield, Ohio. His maternal grandfather, John Simpson, had likewise emigrated to Ohio from Pennsylvania.

Jesse Grant, who had worked as a tanner for the father of the afterwards noted Abolitionist, John Brown, started in business for himself at Ravenna, but removed to Point Pleasant, and in 1823 to Georgetown, about 40 miles from Cincinnati, where Ulysses was brought up, working on his father's farm in summer and attending school in winter. Jesse Grant, desirous that his son should have a better education than he himself had had, procured for him in 1839 an appointment to West Point, where Ulysses in 1843 graduated twenty-first in a class of thirty-nine, and was then commissioned brevet second lieutenant in the Fourth Regiment of Infantry, stationed at Jefferson Barracks, Mo. In May, 1844, his regiment was ordered to Louisiana, and in September, 1845, to Texas, to join the army of General Taylor. In the Mexican War, Grant took part in the battles of Palo Alto and Resaca de la Palma, and was present at the capture of Monterey; was then made quartermaster of his regiment in 1847; participated in the battles of General Scott's campaign, and for his bravery at Molino del Rey, September 8, 1847, was made first lieutenant, and for his conduct at Chapultepec, September 13th, was brevetted captain. In the summer of 1848 his regiment returned, to be stationed first at Detroit and then at Sackett's Harbor. In the same year he was married to a Miss Julia T. Dent, of Saint Louis, sister of one of his classmates at West Point, who survived him many years, dying in 1902. In 1852 he accompanied his regiment to California and Oregon, and on August 5, 1853, was commissioned full captain; but on July 31, 1854, resigned and removed to the neighborhood of

ULYSSES S. GRANT

Saint Louis, Mo., where he cultivated a farm and engaged in the real-estate business. His lack of knowledge of business methods, however, and his carelessness in money matters involved him heavily in debt, and caused him in 1859 to give up and move to Galena, Ill., where he was employed in his father's store at $800 a year. Here he was living when the Civil War broke out in 1861. He immediately recruited and drilled a company of Galena volunteers, and accompanied them to Springfield, where he was employed in the Adjutant-General's department as a mustering officer. He offered his services to the national Government, but, receiving no reply, accepted on June 17th the colonelcy of the Twenty-first Illinois Volunteer Infantry, and served with his regiment under General Pope in Missouri until August 7th, when he was commissioned a brigadier-general of volunteers. In this capacity he served in Missouri; was later placed in charge at Cairo, Ill., and early rendered important service by the seizure, on September 6, 1861, of Paducah, Ky., at the mouth of the Tennessee, and on the 25th of Smithland, at the mouth of the Cumberland, two important strategic points. His next move, a month later, was to check the advance of a large force under General Jeff Thompson, this being successfully accomplished by two battles, one at Fredericktown, Mo., the other at Belmont. The District of Cairo was now enlarged, and General Grant was placed in command. In February, 1862, he moved from Paducah with 15,000 men, aided by Commodore A. H. Foote (q.v.), with a fleet of gunboats, for the purpose of capturing Fort Henry, on the Tennessee, and Fort Donelson, on the Cumberland. The former surrendered February 6th, its reduction, however, being the work of the gunboats; the latter was taken on the 16th, only after a severe battle in which the land forces were engaged. (See FORT HENRY AND FORT DONELSON.) Buckner, who was in command of the fort after the withdrawal of his superior officers, proposed the appointment of commissioners to settle the terms of capitulation, to which General Grant replied: "No terms other than an unconditional and immediate surrender can be accepted. I propose to move immediately upon your works." The capture of this fort was the first important and brilliant victory of the Federal arms, and it made a great impression upon the country. General Grant was at once made a major-general of volunteers, his commission being dated as of the day of the battle; and by a play upon his initials he became widely known as 'Unconditional Surrender Grant.' The battle of Shiloh (q.v.), or Pittsburg Landing, was next fought. The Federal troops at that point were attacked April 6th by a large Confederate force under Gen. A. S. Johnston (q.v.), and suffered heavy loss. General Grant arrived on the field at the critical moment and reformed the broken lines, and heavy reënforcements under General Buell having arrived, the battle was renewed on the 7th and the Confederates, now under the command of General Beauregard (Johnston having been killed), were driven back to Corinth. In this battle General Grant was slightly wounded. He was second in command in the movement against Corinth, which was occupied by the Federal troops on May 30th. When, in July, General Halleck was called to Washington to take command of the armies of the United States, General Grant was assigned to the command of the Department of the Tennessee, with headquarters at Corinth. In September he fought the Confederate General Price at Iuka and defeated him. He then removed his headquarters to Jackson, leaving Rosecrans with 20,000 men to hold Corinth, which he did successfully. In October General Grant's department was enlarged by a portion of Mississippi, including Vicksburg, the forces under his command being designated as the Thirteenth Army Corps. After several efforts by different plans to capture Vicksburg, he was finally enabled, as a result of his brilliant movements, to invest the city, May 18, 1863, and on July 4th General Pemberton surrendered with about 30,000 men. General Grant was now appointed a major-general in the Regular Army, and in October was placed in command of the Military Division of the Tennessee, comprising the departments commanded by Sherman, Thomas, Burnside, and Hooker. General Grant was next called upon to conduct the operations against the Confederate General Bragg at Chattanooga. On November 24th the Federals stormed Lookout Mountain, and on the 25th they carried the heights of Missionary Ridge. General Halleck, in his annual report to the War Department, said that, in view of the strength of Bragg's position and the difficulty of storming his intrenchments, "the battle of Chattanooga must be considered the most remarkable in history. Not only," he continued, "did the officers and men exhibit great skill and daring in their operations on the field, but the highest praise is due to the commanding general for his admirable dispositions for dislodging the enemy from a position apparently impregnable." Congress at its next session passed a vote of thanks to General Grant and his army, and ordered a gold medal to be struck in his honor. The grade of lieutenant-general was revived, General Grant was nominated by President Lincoln for the position, and the nomination was promptly confirmed by the Senate. On March 17, 1864, he issued his first order as commander-in-chief of the armies of the United States. His headquarters thereafter were with the Army of the Potomac. The battles of the next campaign, which had for their object the capture of Richmond, in front of which the main army of the Confederates was concentrated for a last and desperate resistance, were among the bloodiest of the whole war.

The first movements of General Grant, though unsuccessful as to his main design, resulted in crippling the enemy and so preparing the way for final victory; but they were attended with terrible loss of life. The great battle of the Wilderness (q.v.) was fought against General Lee on May 5th-May 6th, and was followed by the bloody engagements at Spottsylvania Court-House. On June 3d Lee repulsed a tremendous assault of the Union forces at Cold Harbor. General Grant, having failed in his flanking movements, saw at last that his only hope of seizing Richmond depended upon his first taking Petersburg, and to this object he now addressed himself with his usual pertinacity. Lee attempted to create a diversion by sending Early on a raid across the Potomac. Sherman soon after forced Hood to evacuate Atlanta, and then started on his famous 'march to the sea.' Sheridan's victory at Five Forks, March 31-April 1, 1865, destroyed the last hope of a successful defense of Richmond. On

April 2d Petersburg was abandoned, and on the 3d the Federal forces entered the Southern capital, the Confederates fleeing as they advanced. Grant pursued the flying army, overtook and surrounded it, and forced it to surrender at Appomattox Court House, on April 9th. Lee was captured, and the Confederacy overthrown.

The assassination of Lincoln and the accession of Andrew Johnson quickly followed, and then came the excitement of the period of Reconstruction, in which General Grant, for whom Congress had created the rank of General of the Army, bore a loyal and honorable part. During the administration of Johnson he was drawn into the struggle between the President and Congress. On the removal of Stanton, Secretary of War, by President Johnson, Grant was asked to fill the office *ad interim*, and held it from August, 1867, to January, 1868. Having become prominent in national politics, he was soon recognized as an available candidate for the Presidency, his military services making it evident that whatever party nominated him would receive a large independent support. He was approached by members of both parties, but his views were more nearly in accord with those of the Republicans. In May, 1868, a convention of soldiers and sailors at Chicago indorsed his contemplated candidacy, and on May 20th the Republican Convention on the first ballot nominated him for the Presidency unanimously, naming for the Vice-Presidency Schuyler Colfax of Indiana. Although the Democratic candidate, Governor Horatio Seymour, carried his own State of New York, he secured only seven other States, with a total of only 80 electoral votes against 214 electoral votes cast for Grant. The new administration was marked by a studied independence of Congressional politicians and by a disregard of various political traditions of the National Government. The apparent influence of a military coterie, coupled with the President's marked reticence as to his views and plans, and his want of tact in dealing with civilians, produced an unfortunate lack of cordiality in his relations with Congress and gave rise to a few incidents of discord. During the campaign he had been conspicuously reticent and inactive, and it was impossible to learn in advance his intentions with regard to matters of public moment. However, he had the confidence of the people at large, and this was increased by the negotiation of the important Treaty of Washington (q.v.) and by the steps which were thus taken for the early settlement of the Alabama Claims (q.v.). The President made foreign relations an important feature of his first administration by his persistent efforts in favor of the annexation of Santo Domingo, the treaty for which, however, was rejected by the Senate, largely through the opposition of Charles Sumner, whose attitude in this matter led to his exclusion, by the friends of the Administration, from his influential post as chairman of the Senate Committee on Foreign Relations. A policy of friendly supervision of the South American States was also followed, and much interest was manifested in the war of independence which was being waged in Cuba, and the danger of intervention seemed imminent, especially for a brief period during the excitement caused by the seizure of the *Virginius*. The political condition of the South continued to present serious problems, although most of the actual work of reorganization had been accomplished: the vindictiveness of the extreme Republicans was abating; and the President was inclined to lessen the direct control of Southern administration at the hands of the National Government, and to look forward to the moral regeneration of the newly organized political bodies through their own initiative unaffected by external influences. (See RECONSTRUCTION.) The scandals attaching to the Crédit Mobilier (q.v.) were looked upon by the President's opponents as sources of weakness; but neither these nor other seeming irregularities had any material effect in the campaign of 1872, when Grant was reëlected with the unprecedented number of 286 electoral votes, and with a popular vote exceeding by more than 700,000 that given to his chief opponent, Horace Greeley (q.v.). The collapse, as it seemed, of the movement of the new Liberal-Republican Party (q.v.) left the President in full authority, with very little opposition, and with very few problems of really national importance to be settled. Financial affairs, the control of the Indians, and minor matters of ordinary significance occupied the greater portion of his second term, which was marked also by various irregularities, such as the scandal of the 'Whisky Ring' (q.v.), in which high Federal officials were concerned, but in which the President himself was in no way implicated, save in so far as he obstinately stood by friends whose guilt was beyond doubt. In 1874 he rendered a great service to his country by his veto of the bill passed by Congress for the inflation of the paper currency, and he was also responsible in a large measure for the passage of the Resumption Act in the following year.

At the close of his second term, in 1877, he made the tour of the whole civilized world, visiting especially the great countries of Europe and Asia, and receiving, as a soldier and civilian and the first citizen of the United States, all the honor which rulers and people could bestow. As the unofficial representative of his country, his bearing was such as to win universal admiration and respect. On his return home in the spring of 1880 a large and influential portion of the Republican Party sought to make him a candidate for the Presidency once more; but the movement was defeated, not because the people did not still admire and trust him, but on account of the formidable opposition to the bestowal of the office upon any man, however eminent or able, for more than two terms.

After his long journey General Grant made his home in New York. He became a partner in a financial firm which came to grief and involved him in pecuniary ruin. The story is a sad one, which will not here be recorded. The only blame that attached to him was that he bestowed too much confidence upon those who misused it. Universal sympathy was accorded to him. With the energy of a young man he took up his pen and wrote out the recollections of his military life, "for the money it gave me," he says, "for at that moment I was living upon borrowed money." Every token of respect was shown to him in the city of his residence, and Congress, by a special enactment in 1884, placed him on the retired list of the army, as General, with full pay—a position he had resigned to become President.

In the summer of 1884 General Grant entered upon a long period of suffering from a cancerous

affection of the throat, and he died at Mount MacGregor, near Saratoga, N. Y., July 23, 1885. Until a few days before his death he was diligently engaged in writing his memoirs, in order, by their sale, to make provision for his family. His body found its final resting-place in a magnificent tomb in Riverside Park, New York City, overlooking the Hudson River.

Memoirs of General Grant's career are numerous. Soon after the Civil War General Adam Badeau, his aide near the close of the war, wrote his *Military History*, in three octavo volumes (New York, 1867-81). In his later years General Grant was induced to contribute to the *Century Magazine* many articles which attracted widespread attention, and were afterwards published in the work entitled: *Battles and Leaders of the Civil War* (New York, 4 vols., 1887), and in his *Personal Memoirs* (New York, 2 vols., 1885). The dedication of the volumes last named, "To the American Soldier and Sailor," is dated New York, May 23, 1885, and the preface at Mount MacGregor, July 1, 1885. There is a short and excellent biography by Col. W. C. Church (New York, 1897); another by Gen. James Grant Wilson (New York, 1868; revised ed. 1886); a study of the ancestry of General Grant by E. C. Marshall (1869), and a story of his tour around the world by John Russell Young. Less noteworthy are Coppée's *Grant and His Campaigns* (1866), and Headley's *Grant and Sherman* (1866). Among the eulogies of General Grant, that by Henry Ward Beecher, in Boston, October 22, 1885, deserves special mention. For a further account of his administrations as President, see the article UNITED STATES.

GRANT, Sir WILLIAM (1752-1832). A British jurist and politician, born at Elchies on the Spey. He was educated at King's College, Aberdeen, and at Leyden University, and was called to the bar in 1774. He was appointed Attorney-General of Canada in 1776, but a few years later returned to England, where he at first met with small success. In accordance with Pitt's advice he entered Parliament in 1790, and soon attained great prominence in that body. He held a number of political offices, notably that of Solicitor-General in Pitt's Administration, which procured him the honor of knighthood. In 1801 he was appointed Master of the Rolls, an office which he held for more than sixteen years, and in the discharge of which he made an enviable reputation as a judge. Consult: Townsend, *Lives of Twelve Eminent Judges* (1846), and Brougham, *Statesmen of the Time of George III.* (1839).

GRAN'TA. An English river. See CAM.

GRANTHAM, grănt'am. An ancient market-town in Lincolnshire, England, on the Witham, 23 miles south-southwest of Lincoln (Map: England, F 4). It is connected with the river Trent by a canal 30 miles long. It has neighboring iron-mines and considerable trade in malting, and manufactures of iron, leather, paper, brick, agricultural implements, and coaches. Its notable buildings are the restored Church of Saint Wulfram, founded in the thirteenth century, and surmounted by an elegant spire, 279 feet high; the thirteenth-century Angel Inn, where King John held court and Richard III. signed Buckingham's death warrant; the free grammar school, founded in 1528, where Sir Isaac Newton was educated; the guild hall with its spacious assembly room; the town hall; the two exchanges; the literary institute; and the library. A bronze statue of Sir Isaac Newton graces Saint Peter's Hill. The town owns the markets. Grantham was incorporated in 1463 by Edward IV., and is represented by one member in Parliament. Here, on May 13, 1643, Oliver Cromwell fought his first successful battle. Population, in 1891, 16,700; in 1901, 17,600. Consult Turnor, *History of the Town and Soke of Grantham* (London, 1806).

GRANT'S GAZELLE. See GAZELLE.

GRANTS PASS. A city and the county-seat of Josephine County, Ore., 300 miles south of Portland, on the Rogue River and on the Southern Pacific Railroad (Map: Oregon, B 7). It has extensive manufactures of lumber in various products, and carries on a large trade as the centre of an agricultural, lumbering, and mining district. There are also railroad machine-shops, brick-yards, and other industrial plants. Population, in 1890, 1432; in 1900, 2290.

GRANULAR LIDS. See CONJUNCTIVITIS.

GRANULATION. A process of healing in wounds whose bleeding surfaces cannot be brought together. In wounds that can be closed, healing often takes place by 'first intention.' (See WOUNDS.) In an open wound, about the seventh day there appears in its depths a mass of bright reddish material arising from all sides, composed of small papillæ. The surface of this new growth is pebbled or granular, and it consists of a number of cells, together with new connective tissue provided with many looping arteries. The surface is sheathed with pus. These papillæ are called granulations. In most cases, where the successive layers of granulations reach the level of the surface of the wounded part, the integument shoots forth from the margins, finally meeting in the centre, and the wound skins over. In other cases the granulations grow above the surface in heaps, and are then termed exuberant granulations, or, vulgarly, 'proud flesh.' Sometimes after granulation has commenced in a wound its surfaces may be brought together and adhere, presenting an instance of union by 'second intention.' It is a fortunate circumstance that granulation tissue is a protection against the invasion of bacteria. The wall-like aggregation of leucocytes, new connective-tissue corpuscles, and new blood-vessels presents no open lymph-spaces through which alone the micro-organisms gain entrance.

GRANVELLA, grän-vĕl'yà, ANTOINE PERRENOT, Lord of (1517-86). A Spanish cardinal and statesman. He was the son of Nicholas Perrenot, Lord of Granvella, Secretary of State under Charles V. and one of that Emperor's most influential ministers, and was born at Ornans in Burgundy, August 20, 1517. He pursued the study of law and theology at the universities of Padua, Paris, and Louvain, and at the age of twenty-three was made Bishop of Arras. Through his father's influence he speedily came to play an important part in the political affairs of the Empire. His defense of Charles's policy delivered at the opening of the Council of Trent (1545) gained him the permanent good will of the Emperor, who employed him in his negotiations with the Protestant princes of Germany in 1547, and who in 1550 made him Secretary of State on the

death of the elder Granvella. As one of the shrewdest diplomats probably of his time, he participated in the negotiations leading to the Peace of Passau (1552), and was instrumental in bringing about the marriage of Philip II. with Mary of England. In 1559 he was made chief minister to Margaret of Parma, Regent of the Netherlands, and became in turn Archbishop of Mechlin and cardinal. As a stranger, and a churchman, who represented the rigorous absolutism of the Spanish Court, Granvella succeeded in arousing the bitter hatred of the Flemings. Margaret of Parma, William of Orange, the Counts Hoorn and Egmont united in demanding the removal of the unpopular minister, and finally, in 1564, Granvella was recalled at his own request. He took up his residence at Besançon and occupied his leisure in literary and scientific studies. He subsequently acted as Spanish representative at the Papal Court, and brought about the formation of the Holy League against the Turks by Venice, the Pope, and Philip II., whose united fleets crushed the Ottoman sea power at Lepanto (1571). After holding the post of Viceroy of Naples for some time he was made in 1575 head of the Spanish Council of State, and in this capacity forwarded the incorporation of Portugal with Spain. In 1584 he became Archbishop of Besançon. He died at Madrid, September 21, 1586. A portion of his public and private papers has been edited by Weiss, *Papiers d'état du Cardinal Granvella* (9 vols., Pons, 1841-61), and Poullet and Piot, *Correspondance du Cardinal Granvella, 1565-86* (9 vols., Brussels, 1878-92).

GRANVILLE, grän'vēl'. A seaport town at the mouth of the Bosq, on the English Channel, in the Department of Manche, France, 28 miles southeast of the island of Jersey, with which it has regular steamship communication (Map: France, E 3). The town consists of an upper and a lower part built on a promontory, surmounted by a citadel. The parish church of Notre Dame is an interesting fifteenth-century Gothic edifice. The tidal harbor is well sheltered, has extensive piers, and a good trade in building-stone, oysters, fish, and oil is carried on. Granville is a popular summer and sea-bathing resort. It dates from an English fort built early in the fifteenth century, which the French captured in 1450; in 1641 the French again took the fortifications, which the English had built the year previously. In 1695 and in 1808 it was bombarded by the English, and in 1793 was almost totally destroyed by the Vendean troops. Population, in 1901, 11,667.

GRAN'VILLE. A village in Licking County, Ohio, 6 miles west of Newark, on Raccoon Creek and on the Toledo and Ohio Central Railroad (Map: Ohio, F 5). It is the seat of Shepardson College for Women, and of Denison University (q.v.). Population, in 1890, 1366; in 1900, 1425.

GRANVILLE, second Earl, George Leveson-Gower (1815-91). An English statesman. The eldest son of the first Earl, he was born in Mayfair, London, May 11, 1815. He was educated at Eton and Oxford; in 1836 was attaché to his father in the Embassy to France; in the same year entered Parliament, and was reelected in 1837. He graduated B.A. in 1839. In the Commons he was a Liberal and free-trader. He became a peer in 1846, vice-president of the Board of Trade in 1848, and went into the Cabinet in 1851, at the close of that year succeeding Palmerston in the Foreign Office. He retired with the Russell Ministry. He was president of the Council, 1852-54, 1855-58, 1859-66, Secretary of State for the Colonies 1868-70, and Secretary for Foreign Affairs 1870-74. During Gladstone's temporary retirement (1878-80), Lord Granville acted as leader of the Liberals. When Gladstone became Premier again, in 1880, Lord Granville once more was made Secretary of State for Foreign Affairs, going out of office with Gladstone in 1885. In 1886 he became Secretary for the Colonies. The chief events of his career were the establishment of Afghanistan as a neutral zone between India and Russia, the participation of England in the Berlin Congress, and the suppression of Arabi Pasha's Egyptian revolt. He was a firm supporter of Irish Home Rule. He died March 31, 1891. Lord Granville was esteemed by men of all parties for his urbanity and unfailing tact.

GRANVILLE, John Carteret. A British statesman (1690-1763). See Carteret, John.

GRAPE (from OF. *grape*, cluster, from OHG. *crapho*, Ger. *Krapfen*, hook). The fruit of any species of the genus Vitis, also, in the United States and Canada, any plant of this genus. In other English-speaking countries the plant is designated the 'vine.' Grapes grow wild in Egypt, Arabia, Turkey in Asia, and in the Mediterranean countries of Europe; more than twenty species are found in America, from Canada to Florida and westward. The cultivated vines of Europe and the Orient all belong to the single species *Vitis vinifera*.

The cultivation of the grape and the making of wine are of the most remote antiquity, as appears from the Scripture history of Noah, and from many passages of the most ancient authors, for example, Vergil and Columella, who both gave instructions in vine cultivation. The mythological fable of the marches of Bacchus relates to the extension of the culture of the vine from Asia into Europe. The vine was probably introduced into the south of France and into Italy by the Phocæans, about B.C. 600, and its cultivation was early coextensive with civilization in all the Mediterranean regions. In Italy so much of the land was occupied by vineyards that the Emperor Domitian, fearing a scarcity of grain, issued a restrictive or prohibitory edict A.D. 81, which remained in force long afterwards through fear that an abundance of fine wine might tempt the barbarians of the north to invade the country. The vine was introduced into England by the Romans. After the Norman Conquest the vineyards which seem to have existed in the south and southwest soon disappeared, having had only occasional successful successors until the nineteenth century, when vine culture in gardens and on walls mainly for fresh fruit increased in this region. The vine does not, in ordinary seasons, ripen its fruit well in Great Britain farther north than Yorkshire, although grapes have occasionally ripened in the open air in Scotland. On the Continent the cultivation of the vine for wine is an important industry as far north as Coblenz, on the Rhine; but in some countries, particularly in Greece and the Ionian Islands, the product of the vineyards is converted into raisins. By

the Spaniards and Portuguese the vine was introduced into the Azores, the Madeira and Canary Isles, and America. The first vines were carried to the Cape of Good Hope by the Dutch in 1650; but while the wines of Madeira and those of the limited district of Constantia at the Cape of Good Hope have long enjoyed a high celebrity, and those of Canary and Teneriffe have been exported in considerable quantities, it is only of late that much attention has begun to be paid to vine culture in the other parts of Cape Colony. Good wines are being made in Australia.

The grape is a perennial, deciduous, woody, climbing vine, which makes itself fast to its support by strong persistent tendrils, opposite or alternate with the large angular, lobed, toothed, and generally hairy leaves. The stems are numerous, very long, branching, of rapid growth, and with many swollen joints; the outer bark readily splits and peels; the woody tissue abounds with vessels of large size, from which at the seasons of active vegetation the sap pours in prodigious quantity if the branch be wounded. The fruit-stalks, which are much branched modified tendrils, are borne on wood of the present season's growth, opposite the leaves. The flowers are small, greenish-white, and fragrant. The fruit is a round or oval berry, two-celled, and four-seeded, which varies in size from about one-fourth of an inch in diameter, as in the Corinth or 'currant' grape, to nearly an inch in some of the improved American varieties. The color, which is entirely in the outer skin, may be green, red, yellow, purple, or in some cases variegated. Although the pulp of the grape is wholesome, nutritious, and gently laxative, the skin is astringent and indigestible. Some of the ovules may be abortive, or even all of them in the fruit of old vines of some varieties, as in the seedless Ascalon or Sultana raisin. The stems sometimes reach a diameter of 18 inches, and the wood, which is very hard and durable, is occasionally employed in making furniture, statues, etc. It attains also a very great age; specimens may remain fruitful for 300 or 400 years. In the Old World *Vitis vinifera* is the basis of all viticultural interests; in America several native species and hybrids between them and *Vitis vinifera* are utilized. The grape upon which the vineyards of the Eastern United States are founded is one of the contributions of that region to the economic plants of the world. All early attempts at viticulture were based upon the Old World grapes. As early as 1621 an unsuccessful attempt was made to introduce the European vine into Virginia, and from that time forward numerous other attempts were made. The undertaking of John J. Dufour in 1798 is especially worthy of note. But, like all other undertakings in which European vines were used, Dufour's "Kentucky Vineyard Society," with $10,000 capital, was unsuccessful, although great care was exercised in the execution of every detail in the work. Later, a partial success came as a result of the introduction of the so-called 'cape grape,' which is now known to have been an offshoot from the fox grape (*Vitis labrusca*). True success came with the introduction by John Adlum of the *Catawba*, 'the first truly American grape.' This variety ranks foremost among the wine and table grapes of the North-eastern United States. The success of grape culture in the Eastern United States has grown remarkably since 1860, and has reached its greatest perfection, both as regards methods of culture and marketing, in New York, New Jersey, Ohio, Maryland, and Virginia, where thousands of acres are devoted to the cultivation of table grapes, although there is a considerable output of wine and brandy in each locality. In the East the end sought is dessert fruit; in the West, wine and raisins.

The early Spanish and French missionaries planted the European vine on the Pacific slope. Here the conditions are more congenial than in the Eastern States, and the industry has flourished from the beginning. With the exception of the famous vineries of Europe, California leads in the production of wine and raisins from *Vitis vinifera*. The largest vineyards in the world are to be found there, and the output of raisins has so increased that the importation of the fruit has greatly diminished, despite the enormous increase in the country's population. Until 1820 the Mission variety was the only European vine planted in Western America, but the list has increased to more than fifty varieties, including those most prized in Europe. The repeated failures with the European grape in Eastern America were due not so much to the climate, as to the ravages of the phylloxera, which found a congenial and very susceptible food plant in the introduced vines. Native vines are able to resist its attacks, but the European vines possess no such power, and when this pest was accidentally transported to France on some native American vines it spread havoc among European vineyards. It was even thought that vine culture in Europe was doomed. Little wonder that varieties failed in the Eastern United States. A remedy was hard to find, but the interest of the French Government in rescuing from destruction its great vineyards and wineries stimulated research, which led to the utilization of the resistant American vines as stocks upon which to graft the European vine, even in its native clime. The success of this plan is evident from the fact that the most remunerative vineyards of Europe have roots of American species. The wine and raisin industry of the United States is being rapidly extended; and numerous successful experiments have been conducted in the South-eastern United States with the European vines grafted upon resistant American stocks.

Vine culture varies greatly in different countries. Success seems to depend chiefly upon sunny exposure, congenial soil, control of diseases, intelligent manuring, and cultivation. New varieties are grown from seed, but the ordinary mode of propagation is by cuttings. The cuttings are made during the dormant period, preferably in the autumn, from ripe wood of the past season's growth, and usually carrying two or three buds. These are heeled in or buried until the following spring, when they are set in nursery rows; one year later the young plants are ready for planting in the vineyard. A soil of medium fertility and gravelly texture is preferred; but certain varieties will thrive upon light soils, others upon heavy, if not too wet. Vines will endure more moisture than most other fruit-bearing plants, yet they must have drained land to give the best results. The grape is usually set in the vineyard at one year from the cutting, 8×8 feet or 8×10 feet being the popular

distances for American vines. During the first year the land is given clean culture, with or without hoed crop; the second year the trellises or supports are partially constructed, and the new growth tied up out of the way of cultivation. The third year the trellises are completed, some bearing wood left, and each vine may be allowed to bear a few clusters of fruit. After the first year no other crop should be allowed to incumber the vineyard. Clean culture should be given until midsummer, after which time means should be taken to check growth and ripen the wood. Pruning the vine is based entirely upon the fact that the fruit is borne upon wood of the present season's growth, which arises from the buds of the last season's growth. All wood for fruiting purposes must, therefore, be one year old. All systems of pruning are either renewal or spur systems. Renewal systems seek to maintain the fruit production near the root or main trunk; spur systems renew on shoot spurs arising at intervals along a permanent arm. For description of various systems, consult Bailey, *Cyclopedia of American Horticulture* (New York, 1900).

Besides the manufacture of wines, brandies, raisins, and the use of grapes for dessert purposes, unfermented grape-juice is becoming a valuable and popular product. This is made by expressing the juice, sweetening, heating to the boiling-point, and sealing while still hot in cans or strong bottles. See also WINE; BRANDY; RAISINS; CURRANTS; VITACEÆ.

GRAPE.
Wild American, source of the Catawba, Isabella, etc.

GRAPE DISEASES. Few plants are subject to as many and as serious diseases as the grape, and few plant diseases have been more fully investigated. Diseases of the grape are caused by improper conditions of soil and moisture, but more frequently by fungi and bacteria, which are often carried from diseased to healthy plants by insects. A few of the more destructive and widely spread diseases may be briefly considered here. *Downy mildew* (*Plasmopara viticola* or *Peronospora viticola*) produces yellowish spots upon the upper surface of the leaves and a downy-frosty appearance beneath. Later these spots appear as light-brown discolorations. The same fungus occurs upon the fruit, when it is known as 'brown rot' or 'gray rot,' according to the nature of the attack. The brown rot of the fruit is first manifested by purplish discolorations, soon after the appearance of which the pulp becomes soft, and forms depressions, over which the skin is tightly drawn. The gray rot which attacks the young berries and their pedicels resembles the downy growth mentioned as occurring on the leaves. Downy mildew and black rot, next to be discussed, are the two most serious general grape diseases. *Black rot* (*Læstadia Bidwellii*) attacks the leaves at first as reddish-brown circular spots; later a number of spots may coalesce and form irregular blotches. Upon the fruit, the first sign of attack is the appearance of small brownish discolorations, which soon enlarge, the whole berry gradually becomes brown or black, withers, and finally dries up, usually remaining attached to the stem. *Anthracnose* (*Sphaceloma ampelinum*) attacks leaves, stems, and berries. Upon the leaves it appears as dark spots surrounded by well-marked darker bands of color. The centres later turn gray, and frequently the diseased areas fall out, giving the leaves a ragged appearance. Upon the shoots the disease manifests itself in much the same manner. On the fruit the disease is often termed 'bird's-eye rot,' from the peculiar appearance of the spots. The centres become gray, with an outer band quite dark and sometimes a zone of vermilion color between them. When the young fruits are attacked they turn brown, and pink pustules appear over the surface. The tissues of the berry with this rot become hard and leathery. *Bitter rot* (*Glœosporium fructigenum*) attacks the stems and fruits, especially the latter, which become bitter, whence the name. In this disease the berries turn brown, become thickly dotted with purplish-black pimples, and ultimately fall at the least disturbance. The best preventive measures for these diseases is thorough spraying with Bordeaux mixture. *Powdery mildew* (*Uncinula spiralis*) is troublesome in grape-houses and in the vineyards of France, but less in the vineyards of the United States. It covers the leaves, young shoots, and fruits with a powdery, meal-like growth. Upon the leaves and fruits it forms patches of various size and shape on the upper surfaces. Soon the berries shrivel, the skin cracks, and other agents of decay complete the destruction. For the prevention of the disease, sulphur is perhaps the best remedy. It may be dusted over the vines in the open, or it may be evaporated without ignition in the grape-house. See FUNGI, ECONOMIC; DISEASES OF PLANTS; FUNGICIDE. Consult: Tubeuf, *Diseases of Plants Induced by Cryptogamic Parasites*, translated by W. G. Smith (New York, 1897); Pierce, "Grape Diseases on the Pacific Coast," in *Farmers' Bulletin 30*, United States Department of Agriculture (Washington, 1901); and the authorities referred to under FUNGICIDE.

GRAPE ANTHRACNOSE, *Sphaceloma ampelinum*. A serious fungous disease of the grape most frequently seen upon the fruit as hard, scabby patches, but most destructive on the young growth and the fruit-stems as sunken, discolored pits. All prunings, leaves, and rubbish in the vineyard should be burned in early spring, and vines, posts, trellises, etc., should be sprayed with strong solution of copper sulphate. See FUNGICIDE.

GRAPE CURE. A method of treatment of some diseases and conditions with a diet of which grapes form a very large part. This treatment is in vogue to some extent in France, but to a much greater extent in Germany and in Hungary, in which countries, as well as in Austria and Switzerland, there are sanitariums at which the

grape cure is systematically administered. According to Carrière, the cure formerly consisted of an exclusive diet of grapes, taken to repletion. It was usual to commence with a pound, and rapidly increase the amount to eight pounds a day. The first meal, consisting of a large amount of grapes, was eaten early in the bedroom. The second meal was taken in the vineyard, at breakfast time. The third meal, at noon, after the morning walk, consisted of bread and water. The fourth meal was taken early in the evening, and consisted of grapes only. It has been found that an exclusive diet of grapes causes emaciation; while if meats and other food be added the patient gains. The modified grape cure now in vogue therefore includes a large quantity of grapes before breakfast, with bread, if preferred; a breakfast, an hour later, of bread, tea, or coffee, or cocoa, and a broth; grapes again an hour before the midday meal, and again an hour before the evening meal.

Grapes differ much in composition; but Smith gives the following percentage for ripe, medium-sized grapes:

Soluble	
Grape-sugar	13.8
Tartaric acid	1.12
Nitrogenous matter	.8
Gum, fat, etc.	.5
Salts	.36
Water	79.8
Insoluble	
Skins, stones, etc	2.6
Pectose	.9
Mineral matter	.12

From the experiments of Bichof and Voigt we learn that a diet of 400 grams of meat and 300 grams of grape-sugar caused a gain of 92 grams in weight in one who had lost 23 grams under a diet of 500 grams of meat and 200 grams of grape-sugar, and had lost 230 grams under a diet of 500 grams of meat and 100 grams of grape-sugar. Therefore about 4 pounds of grapes daily, with nourishing meats and some bread, form the proper diet at a grape-cure establishment. The grape cure has been of advantage in diarrhœa, dysentery (non-amœbic), hæmorrhoids, engorgement of the spleen, and plethora of the portal system; and has caused improvement in cases of tuberculosis, gout, and some skin diseases. Undoubtedly regular habits of life, sufficient sleep, out-of-door life, climate, and water play a significant part in all improvement secured from a grape cure.

GRAPE-EATER. See White-Eye.

GRAPE FAMILY. See Vitaceæ.

GRAPEFRUIT (so called from the flavor, which resembles that of the grape), Pomelo, Pumelo, Pompelmos, Shaddock (*Citrus Decumàna*, Linn; *Pomelanus*, Hort.). A valuable dessert fruit of the genus Citrus, extensively cultivated in Florida, California, India, the West Indies, and most tropical countries. Round-fruited sorts are called pomelos or grapefruits, and are of most commercial value; the pear-shaped sorts, or shaddocks, are grown more as curiosities, and are seldom found in the markets. For illustration, see Colored Plate of Citrus Fruits.

GRAPE HYACINTH (so named from the flower-clusters in some species resembling small clusters of grapes), *Muscari*. A genus of 40 or 50 species of bulbous-rooted, spring-blooming plants, of the order Liliaceæ, nearly allied to the hyacinth, but differing in the globose or subcylindrical perianth, contracted at the mouth. The species are natives chiefly of the Mediterranean region and the warmer temperate parts of Asia.

GRAPE HYACINTH.

Some of them are frequent in our flower-borders. The musk hyacinth (*Muscari moschatum*) has a smell of musk. *Muscari racemosum* is a somewhat doubtful native of the south of England. The common grape hyacinth (*Muscari botryoides*), a native of the Mediterranean region, has escaped from cultivation in various parts of the United States. It has pale blue flowers, and is extensively cultivated. Numerous varieties of this and other species are known to the horticultural trade.

GRAPE-SHOT. A number of small projectiles secured together by an iron pin, or a series of iron plates containing holes in which the shot is held. Formerly a very effective form of shot, but now practically superseded. See Artillery; Canister; Ordnance; Projectiles; Shrapnel.

GRAPE-SUGAR. See Glucose.

GRAPHIC METHOD. The method of representing relations between magnitudes by a diagram. In arithmetic, comparisons of statistics may often be represented graphically; e.g. the

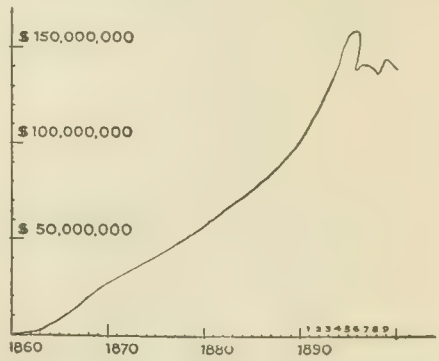


Fig. 1.

curve in the annexed figure represents the sums paid by the United States Government for pensions in various years as follows (by ten millions of dollars): 1862, 0.8; 1863, 1; 1864, 5; 1865, 8; 1870, 28; 1880, 57; 1890, 106; 1891, 119; 1892, 141; 1893, 158; 1894, 141; 1895, 141; 1896, 139; 1897, 141; 1898, 146; 1899, 139.

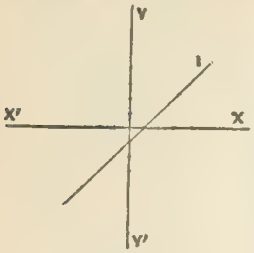


Fig. 2.

In algebra the graphic method of representing equations may be illustrated thus: To represent the equation $y = x - 1$, x may have the values: $-1, 0, 1, 2 \ldots$ In which cases y will have the values $-2, -1, 0, 1 \ldots$ Plotting the corresponding values of x and y as rectangular coordinates (see COÖRDINATES), the line l is called the graph of the equation $y = x - 1$. Similarly the graph of the equation $2x^2 - 3y^2 = 10$ is as

Fig. 3.

shown in Fig. 3, the corresponding values of x and y being

$$x = \pm\sqrt{5}, \pm\sqrt{6}, \pm\sqrt{7}, \pm\sqrt{8}, \cdots$$
$$y = 0, \pm\tfrac{1}{3}\sqrt{6}, \pm\tfrac{2}{3}\sqrt{3}, \pm\sqrt{2}, \cdots$$

In mechanics the condition of equilibrium of a system of concurrent plane forces may be expressed by the closing of a broken line; e.g. the forces f_1, f_2, f_3, acting at the point P, are in equilibrium when the three lines f_1', f_2', f_3', parallel to f_1, f_2, f_3, form a triangle. Such polygons are called funicular polygons. The analytic rep-

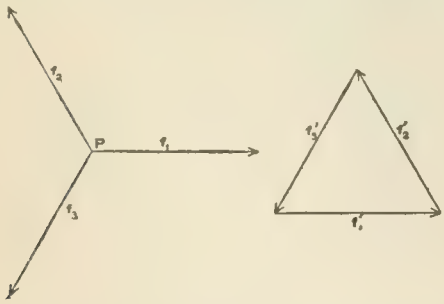


Fig. 4.

resentation of the forces is very simply effected by means of complex numbers. Another use of the graphic method may be seen in the case of the hodograph (q.v.).

GRAPHITE (from Gk. γραφή, *graphē*, writing, from γράφειν, *graphein*, to write), BLACK LEAD, or PLUMBAGO. A dark steel-gray to black mineral, having a black streak, hardness of 1.2, and specific gravity of 2.25 to 2.27. It crystallizes in the hexagonal system, and may occur in foliated form, massive, or even in hexagonal crystals, but its greasy feel, softness, and black streak enable it to be easily distinguished. While black lead is the popular name, it is misleading, for graphite is nearly pure carbon, with only 1 or 2 per cent. of impurities, as can be seen from the following analyses:

ANALYSES OF GRAPHITE

	Carbon	Ash	Volatile
Ceylon	% 98.817	% .28	% .90
Brougham, Can.	97.626	1.78	.594

Although widely distributed, graphite rarely occurs alone in large deposits, but is usually mixed with other minerals, so that it requires special treatment after mining to separate it from the accompanying rock. It is usually found in crystalline metamorphic rocks, such as limestones, gneisses, or schists, and especially those of Pre-Cambrian age; still deposits are known to occur in the Carboniferous. It has also been found in small quantities in meteorites. Two forms of graphite are recognized, viz. the crystalline or true graphite, and the amorphous or graphitic anthracite. The deposits form veins, disseminations, or beds. On account of the chemical similarity to anthracite coal, many have considered graphite to be of organic origin, and some have taken its presence in Pre-Cambrian rocks as an indication of the existence of plant life at that time. The organic theory is correct, however, in only a few instances: e.g. when beds of coal are found passing into graphitic anthracite as the result of intense metamorphism in certain parts of the deposit. The Rhode Island and Bavarian graphite is of this nature. In vein deposits or disseminations in gneissic rocks, it is more probable that it has originally been introduced into the rock in the form of a liquid hydrocarbon, which has subsequently been converted into graphite; while in other cases, as in Ceylon, Weinschenk believes that the graphite is of volcanic origin, and due to the reaction between carbon dioxide and cyanogen compounds. In some limestones which have been subjected to contact metamorphism the carbonaceous matter has been changed to graphite.

The chief commercial sources of graphite are Ceylon and Austria-Hungary, smaller amounts being produced in Bavaria, Italy, Siberia, Mexico, Japan, Canada, and the United States. The Ceylon deposits, which are worked entirely by natives, are of great extent, and masses of solid graphite weighing several hundred pounds are sometimes found. The Canadian graphite occurs in Laurentian rocks, notably in the vicinity of Brougham, and has been obtained in lumps of large size. In the United States crystalline graphite is mined near Hague, N. Y., and to a considerable extent in Chester County, Pa. At the former locality it occurs in a bed of quartzite inclosed between gneiss. Other localities in the United States are Alabama, Wyoming, North Carolina, Wisconsin, Michigan, and Rhode Island. That obtained from the last two localities is amorphous graphite.

Graphite is used in the manufacture of lead pencils, lubricants, stove-blacking, paint, refractory crucibles, and foundry facings. For pencils and lubricants the best grades have to be employed, and in the manufacture of crucibles,

which consumes the larger part of the product, the graphite has to be mixed with clay and sand. Recently the substitution of a mixture of graphite and grease for red lead has met with much success. Since graphite, as it occurs in nature, is always mixed with other minerals, the material after being mined is crushed, and then put through some kind of cleaning or concentration process. The separation is done either by means of an air-current or water, preferably the latter.

In 1898 the manufacture of artificial graphite from coke was begun at Niagara Falls, and in the year of its discovery 200,000 pounds of carbon rods were graphitized in the electric furnaces, while in 1900 the production had risen to 860,750 pounds. It is said that the artificial product is fully equal to the natural material in its electrical conductivity, for use as a lubricant, and in the manufacture of stove-polish or lead pencils.

Although the production of graphite in the United States has been increasing almost every year, still the amount produced is far from sufficient to supply the domestic demand. The imports therefore continue to be large. In 1897 the imports were 19,114,000 pounds, valued at $270,952, and in 1900 they were 32,299,000 pounds, valued at $1,390,141. The production of the United States for the same years was 3,393,000 pounds ($56,091), and 6,193,000 pounds ($172,762), respectively.

BIBLIOGRAPHY. Newberry, "The Origin of Graphite," in *School of Mines Quarterly*, vol. viii. (New York, 1887); Dawson, "On the Graphite of the Laurentian, in Canada," in *Quarterly Journal of the Geological Society of London*, vol. xxvi. (London, 1870); Postlethwaite, "On the Formation of Graphite in Contact Metamorphism," in *American Journal of Science*, vol. xii. (New Haven, 1891); Downs, "Occurrence, Treatment, and Application of Graphite," series of articles in the *Iron Age* (New York, 1900); Weinschenk, *Zur Kenntniss der Graphitlagerstätten* (Munich, 1897). For statistics of production and notes in regard to the trade, consult *The Mineral Industry*, vols. i. to x. (New York, 1893-1902).

GRAPHOPHONE (from Gk. γραφή, *graphē*, writing + φωνή, *phōnē*, voice). A machine for reproducing human speech and other sounds, invented by Charles S. Tainter and Chichester A. Bell. Its principle is the same as that of the phonograph (q.v.) of Edison, but it differs in mechanical details, and in employing a wax-coated cylinder of pasteboard instead of an all-wax cylinder.

GRAPHOTYPE (from Gk. γραφή, *graphē*, writing + τύπος, *typos*, type). A process for producing illustrations using an engraved surface, from which printing can be effected on an ordinary press. Drawings are made on a zinc plate covered with finely powdered French chalk, brought to a hard, firm surface by great pressure. The picture is drawn with a camel's-hair brush and an ink made of glue and lampblack. The uninked portion is then rubbed away and an electrotype made of the picture. This method was only partially successful, and has been superseded by other and more modern processes.

GRAPNEL. See ANCHOR.

GRAPTOLITE, grăp'tō-līt (from Gk. γραπτός, *graptos*, written, marked + λίθος, *lithos*, stone). A class of extinct animals, allied to the hydrozoa, fossil remains of which are found in the lower Paleozoic rocks, especially in those of Upper Cambrian, Ordovician, and Silurian age. The group derives its name from the likeness of its members to pencil markings on the rocks. They are found most abundantly in black shale formations, and they are of great importance to the geologists because of their numerous species, that follow each other in rapid evolutional series through successively higher formations. Because of these lines of descent and the wide distribution of the species, graptolites are ideal horizon-markers or index fossils in the lower Paleozoic rocks.

The graptolites are delicate hydroid-like colonies growing from a minute embryonal polyp that was incased in a chitinous theca or cell, called the 'sicula.' From this sicula grew, by budding, a series of zoöids or individuals, the form of which is still recognizable in that of their fossilized chitinous coverings, the thecæ. Refined methods of isolation and decoloration of the graptolite colonies have been developed by Holm and Wiman, and have enabled these observers to remove the colonies bodily from the inclosing rock, and section them in a microtome after much the same methods employed in histology. In this way the structure of the graptolite colonies has been shown to be much more complicated than had been suspected. This is especially true of the first group, the Dendroidea, to which belong sessile colonies with the forms of miniature trees (Dendrograptus) or of woven baskets (Dictyonema) (q.v.). In these Dendroidea three different forms of thecæ have been found, viz.: Thecæ proper, or nourishing individuals; alternating canals, considered by Wiman as gonangia or reproductive individuals; and gemmating or budding individuals. Other authors, as Frech, held the alternating canals to have been nematophores. See HYDROIDS.

The second group, Graptoloidea, consists of the older Dichograptidæ and the younger Diplograptidæ. In the former there grow, by successive forkings, from the sicula or embryonal cell, which is centrally situated, more or less numerous branches, each of which grows distally (at its extremity) and consists of a single series of thecæ proper. This family, which begins in the upper Cambrian and does not extend beyond the Ordovician, exhibits a most remarkable evolution from irregular many-branched forms (Clonograptus) to symmetrical forms with eight branches (Dichograptus), then to four-branched forms (Tetragraptus), and finally to biramous species (Didymograptus), with which last the family becomes extinct. An aberrant side line from this family is the genus Phyllograptus, in which the four branches of Tetragraptus become united along their dorsal sides to form colonies with cross-shaped sections.

The younger Diplograptidæ, of which the type genus is Diplograptus, possess a central disk which apparently was a 'float,' and which bore a circle of reproductive sacs (gonangia), containing siculæ and numerous stipes (hydrorhabds). The latter are biserial in Diplograptus, each being borne on a long stem (hydrocaule), with a sicula at its farther end, from which the cells grow backward along the stem. The latter forms hence an axis within the stipe, wherefore Diplograptus and its allies have been separated, as

Axonophora, from the preceding forms (Dichograptidæ) without axes, as Axonolipa. Diplograptus begins in the Middle Ordovician, and extends a short distance into the Silurian. It is succeeded by forms possessing the same general structure of the colonies, but with only uniserial arrangement of the cells, the Monograptidæ. These flourished in the Silurian, where their colonies attained a great variety of form. Only the genus Dictyonema passes with a few species into the Devonian system.

The systematic position of the graptolites is uncertain. They are usually classed with the Hydroidea, as they show a general resemblance to some of the members of that group, namely the Sertularians. The rapid evolution of the graptolites and the different aspects of the faunules of successive beds has permitted the recognition of numerous graptolite zones in the Ordovician and Silurian rocks. In the Swedish Silurian alone fifteen zones have been distinguished. Some of the graptolite zones exhibit an astonishingly wide geographical distribution; a like succession of graptolite faunas has been found in Scandinavia, Great Britain, France, North America, and Australia. This extensive distribution, which gives the graptolites great importance for the correlation of geographically widely separated Paleozoic formations, is due to their having been pelagic animals, which were either free-floating or fastened to seaweeds floating in the open ocean. They are in sharp contrast to the great majority of the fossils, corals, mollusks, and crustaceans, which were littoral animals, living in the shallow waters near the shore. For this reason the graptolites are nearly always found separated from other fossils, in a facies or peculiar rock phase of their own, the graptolite shales, mostly dark gray and black carbonaceous shales, upon the bedding planes of which they are crowded in immense numbers.

BIBLIOGRAPHY. Zittel and Eastman, *Textbook of Paleontology*, vol. i. (London and New York, 1900), where a short bibliographic list is given; Hall, "Graptolites of the Quebec Group," in *Canadian Organic Remains, Decade II., Geological Survey of Canada* (Montreal, 1865); Holm, various papers on the graptolites, in *Geologiska Föreningens i Stockholm Förhandlingar* (Stockholm, 1895-1900); Lapworth, "Notes on the British Graptolites," in *Geological Magazine*, vols. x. and xiii. (London, 1873-76); Wiman, "On Monograptus and Diplograptus," in *Journal of Geology*, vol. ii. (Chicago, 1893); Wiman, "Ueber die Graptoliten," *Bulletin of the Geological Institute of the University of Upsala*, vol. ii. (Upsala, 1895); Ruedemann, "Synopsis of Recent Progress in the Study of Graptolites," in *American Naturalist*, vol. xxxii. (Boston, 1898); id., "Growth and Development of Goniograptus," in *Bulletin of the New York State Museum*, No. 52 (Albany, 1902). See HYDROZOA; CŒLENTERATA; CAMBRIAN SYSTEM; ORDOVICIAN SYSTEM; SILURIAN SYSTEM.

GRAS, grä, BASILE (1836-1901). A distinguished French military officer and inventor. He was born at Saint-Amans de Pellaga (Department of Tarn-et-Garonne), and was educated at the Ecole Polytechnique and the Ecole d'Application at Metz. It was a time when all the nations of Europe were casting about for an improved infantry firearm, and the known genius of Captain Gras soon gained him national recognition. His *fusil modèle* (or 'Gras rifle'), as it was universally known, was adopted by the French Government, and in 1874 the infantry troops were armed with it. It was subsequently displaced by the discovery and introduction of the magazine principle, the Lebel rifle taking its place in the French Army. It is still occasionally used, however, in Asia and South America. Gras became a professor at the School of Gunnery at Châlons, and was appointed a permanent member of the Government commission on firearms at that place. In 1888 he was appointed general inspector of the manufacture of small arms, receiving also the rank of general of division. He was a recognized authority in his branch of the military profession, and was the author of many important papers and treatises in service magazines.

GRAS, FÉLIX (1844-1901). A writer of the modern Provençal language. He was born at Malemort, Vaucluse, May 3, 1844. After completing his studies at Béziers, he settled in Avignon, where he became associated with the founders of the modern Provençal revival. Joseph Roumanille, the so-called father of the Félibrige, was his brother-in-law. He expressed his republican sentiments in a kind of operatic piece, *La Carmagnole*, the performances of which were stopped by the authorities. His first verses in Provençal appeared in the *Armana Prouvençau* (Provençal Annual), in 1867. In 1876 he published *Li Carbounié*, a narrative poem in twelve cantos, and six years later *Toloza*, a more successful poem, also in twelve cantos, treating of the Albigensian Crusade. His best work in poetry is the *Romancero Provençal*, a collection of songs and short pieces. A volume of stories called *Li Papalino*, treating of the days of the popes in Avignon, appeared in 1891. All these writings were published in Provençal with a French translation. In 1891 he succeeded Roumanille as *Capoulié* (chief) of the Félibrige, which position he held until his death. In 1898 appeared his historic novel *The Reds of the Midi*. Singularly enough, it was first published in New York, in the English translation of Mrs. Catherine Janvier. A year later he wrote *The Terror* and *The White Terror*, a sequel to *The Reds of the Midi*; these were published in Provençal, French, and English, the English version being made by Mrs. Janvier. Félix Gras died March 4, 1901. See FÉLIBRIGE.

GRASBERGER, grās'bĕr-gēr, LORENZ (1830—). A German classical philologist, born at Hartpennig. He was appointed a professor at the University of Wurzburg in 1867. His most important work is a comprehensive history of education in antiquity, *Erziehung und Unterricht im klassischen Altertum* (1864-81).

GRASHOF, grās'hōf, FRANZ (1826-93). A German engineer, born at Düsseldorf, and educated at the Industrial School in Berlin. In 1863 he was appointed professor of applied mechanics at the Polytechnical School, Karlsruhe, and director of the department of machine construction in that institution. For more than thirty-five years he was president of the Society of German Engineers, which society upon his death erected a monument to his memory at Karlsruhe. Besides numerous contributions to periodicals and editions of Redtenbacher's *Re-*

sultate für den Maschinenbau (1870 and 1875), he wrote the independent works entitled: *Theorie der Elasticität und Festigkeit mit Bezug auf ihre Anwendungen in der Technik* (2d ed. 1878), and *Theoretische Maschinenlehre* (in three parts, 1875, 1883, 1890).

GRASLITZ, grās'lits (Bohemian *Kraslice*). One of the most important manufacturing towns of Bohemia, situated 20 miles north of Eger (Map: Austria, C 1). Noteworthy among its many manufactures are lace, linens, ready-made articles of dress, and wind instruments. Population, in 1890, 10,009; in 1900, 11,803.

GRASMERE, grās'mēr. A village near a lake of the same name in Westmoreland, England, four miles northwest of Ambleside. It is famous as a favorite residence of the Lake School of poets, Wordsworth, Coleridge, and Southey (Map: England, C 2). Population, in 1891, 1016; in 1901, 781. The village, picturesquely situated at the head of the lake, contains the ancient church of the *Excursion*, and in the churchyard are the graves of Wordsworth and Hartley Coleridge. The lake, oval in form, with its 'one green island,' is 1¼ miles long, half a mile broad, and 130 feet deep. It is girdled by high mountains, and forms one of the most beautiful scenes in England, nearly every point of which is celebrated in Wordsworth's poetry.

GRASS. See GRAMINEÆ; GRASSES.

GRASS (AS. *græs*, Goth., OHG. *gras*, Ger. *Gras;* ultimately connected with Eng. *green*, *grow*, and with Lat. *gramen*, Gk. χορτός, *chortos*, grass). The herbage or vesture of the soil (*vestura terræ*). It is a part of the soil or land in which it grows, and passes, like standing trees and houses, with the freehold. It may be cut by a tenant for life or years without impeachment of waste, but it does not come under the description of an emblement (q.v.), not being an annual crop of the sort which a tenant at will may, after the termination of his lease, gather as the fruit of his labor. See also COMMON; PASTURE.

GRASS BASS. See CALICO BASS.

GRASS CLOTH. A name often, although erroneously, given to certain beautiful fabrics manufactured in the East from different kinds of fibres, none of which are produced by grasses. One of these fabrics is made from the fibre of *Bœhmeria nivea*, popularly called ramie (q.v.), or China-grass; another, also known as *pina muslin*, from the fibre of *Bromelia pigna*. (See BŒHMERIA and BROMELIACEÆ.) The kinds of cloth really made from the fibre of grasses are extremely coarse.

GRASSE, grās. The capital of an arrondissement in the Department of Alpes-Maritimes, France, 18 miles west of Nice, and 8 miles from the Mediterranean (Map: France, N 8). It is picturesquely situated on a garden-covered hill, and has steep and narrow streets. Public buildings of historic and artistic interest are the hospital chapel, with its three paintings by Rubens, the parish church, an ancient cathedral, dating from the twelfth and thirteenth centuries, and the city hall, a former bishop's palace. Grasse is one of the largest perfume and essence manufacturing centres of France, and about 60,000 acres in its vicinity are covered with flower-gardens. Considerable quantities of essence of flowers are exported to Cologne and other places. The town dates from its settlement by Sardinian Jews in the sixth century. Population of the commune, in 1901, 15,429, of whom about 9000 lived in the town.

GRASSE, FRANÇOIS JOSEPH PAUL, Marquis DE GRASSE-TILLY, Count de (1722-88). A French admiral, who commanded the French fleet at the siege of Yorktown during the American Revolution. He was born in Provence, and began his naval career at fifteen in the service of the Knights of Malta. Later entering the French navy, he was promoted to be a lieutenant in 1754 and a captain in 1762. In 1778 he commanded a squadron that was sent to join d'Estaing in the West Indies, and took part in the operations at Saint Lucia and Santo Domingo. In 1781, with the rank of admiral, he was placed in command of the new French fleet sent to America, which was intended both to reenforce the French in the West Indian waters and to coöperate with Rochambeau on the North American continent. After touching first in the West Indies, the fleet of 29 sail reached Chesapeake Bay on August 30th, where De Grasse blockaded the James and York rivers, and on September 5th repulsed an attack of the English fleet under Graves. After rendering invaluable assistance at the siege of Yorktown (q.v.) he sailed away to the West Indies again, where his operations for some time were crowned with great success. Finally, off Santo Domingo, on April 12, 1782, he met the English fleet under Rodney, who signally defeated him and carried him a prisoner to London. Charges of incapacity and even treason were brought against him, and although after a thorough examination he was exonerated by the Council of War, he never again held a naval command. He wrote in his own defense a *Mémoire justificatif* (1782). Consult: *The Operations of the French Fleet Under De Grasse in 1781-2*, in "Bradford Club Series," No. 3 (New York, 1864); *Magazine of American History*, vol. vi. (New York, 1881); Winsor, *Narrative and Critical History of America*, vol. iv. (London, 1886-89).

GRASSERIE, grās'rē' (Fr.). A disease of silkworms, not contagious and not hereditary, and apparently produced by a lowering of the temperature of the rearing-room. Affected worms crawl slowly and have a stretched, thin skin. A liquid exudes through the skin, soiling the food and the neighboring worms. Proper regulation of the temperature is the remedy. See SILKWORM.

GRASSES (*Gramineæ*). A natural order of plants, which contains more than 300 genera and 3500 species. Its members vary in size from moss-like specimens less than an inch in height to gigantic bamboos 100 feet or more tall. They are distributed over nearly the whole world; some are characteristic of the hottest tropical regions, others of the far north and south, in the vicinity of almost perpetual snows. In number of specimens they are most abundant in the north temperate zone, where they clothe with verdure immense tracts of prairie, meadow, and steppe, and may be found growing or may be made to grow on almost every kind of soil. Some species are peculiar to dry, sterile soils; others will flourish only in rich soils with abundant moisture. Some grow in marshes, stagnant water, or slow streams, and others only along

the seacoast. None are truly marine. Some are annual, others perennial. The roots of all grasses are fibrous. Many have more or less thickened underground rootstocks or rhizomes, which are not true roots; but modified stems, from which roots are sent out and from which new plants may arise under conditions favorable to propagation. The stems, which usually branch more or less at their bases, are round or slightly flattened, jointed, and hollow between the joints except in maize, sorghum, and a few other species. The parts of the stem between the joints, or nodes, are called the internodes. The stem elongates by growth at the base of the internodes. From the nodes, or joints, arise the leaves and branches. In some grasses roots are put out from the joints when near or lying upon the ground. If a stem is bent or broken so as to lie upon the ground, growth at once begins in the lower side of the stem and is rapidly continued until the stem again assumes an upright position. In most grasses the stems are herbaceous; in the bamboos and some other species they are woody. The leaves consist of two parts, the sheath and the blade. The sheath, which is split on the opposite side from the blade, invests the stem and protects the lower growing portion of the internode. At the top of the sheath is usually found a thin membranous prolongation, called the ligule. The leaf-blade is usually long and narrow, with nearly parallel longitudinal veins.

Many grasses are provided with peculiar adaptations to protect them against drought and hot winds. Between the veins on one side or the other are large, thin-walled cells that keep the leaf expanded when normal conditions are present. When dried by hot winds they collapse and cause the leaf to roll its margins inward, thus protecting it against too great evaporation. When rain comes the cells swell out and cause the leaf to return to its normal shape. The position of the leaves upon the stem in grasses is opposite and two-ranked, a character by which grasses may

PAMPAS GRASS.

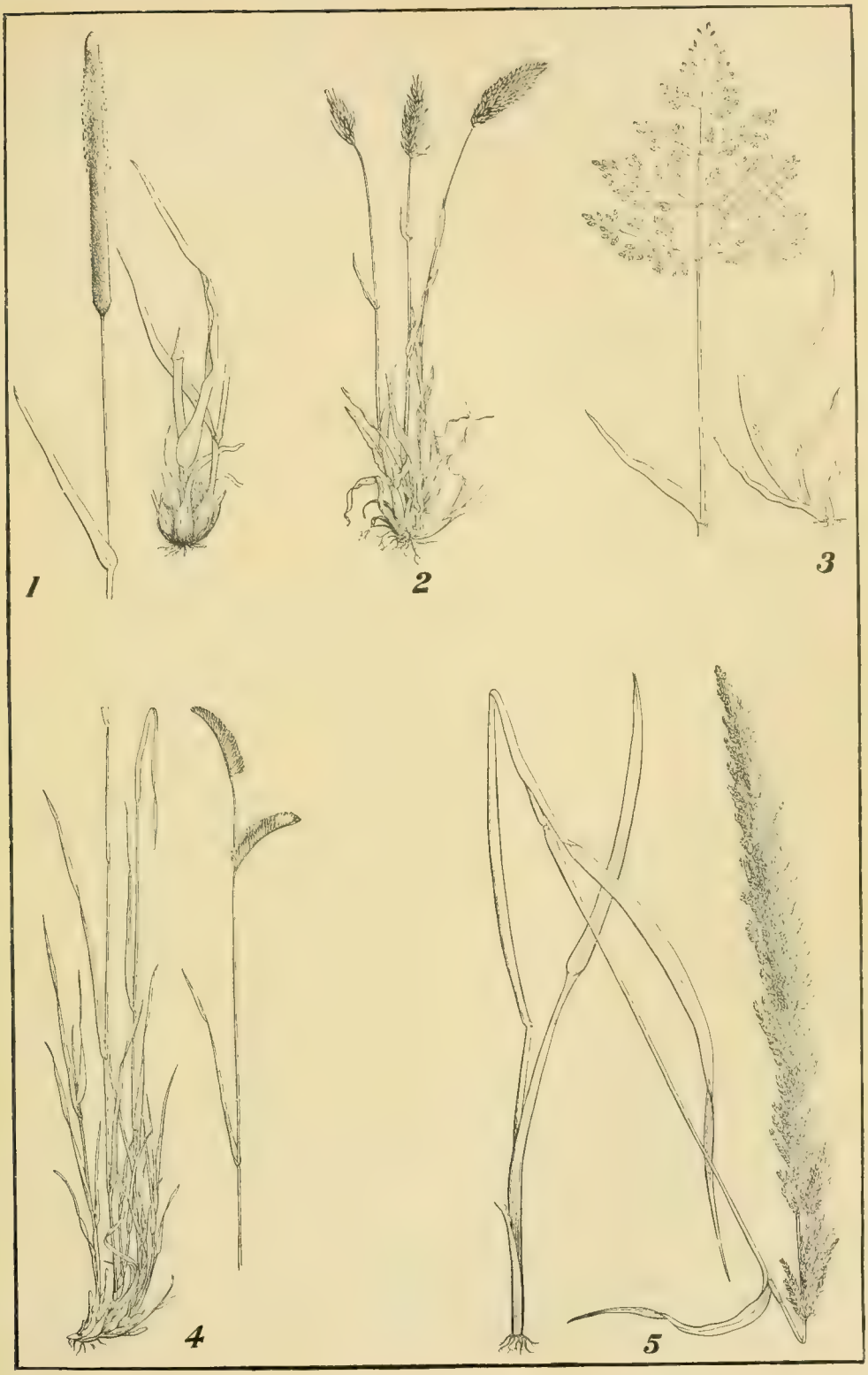
be distinguished from sedges, which have three-ranked leaves. Lawn and meadow grasses have leaves that grow constantly from their bases, so that when cut they quickly elongate, instead of remaining in the shorn condition. Grass-flowers possess only the essential organs, i.e. stamens and pistils; the scales and bracts surrounding them are reduced and modified leaves. The flowers of some grasses have both stamens and pistils; others have the staminate and pistillate flowers upon different parts of the plant, as in the case of maize, in which the tassel consists of staminate flowers and the silk of the ears of the pistillate flowers. Still others have them upon different individuals. The usual number of stamens in the flower is three, but the number varies from one to six, and in some genera they may be from 20 to 30. The anthers, which are usually conspicuous, are generally attached by the middle of their backs to the slender filaments, so that they sway in the winds. The pistils consist of the ovary and usually two plumose stigmas,

BUFFALO GRASS.

which may be sessile or raised upon styles. The ovary contains a single ovule, which ripens with the ovary wall, or pericarp, into a true caryopsis. The flowers are arranged in spikelets, which contain one or more flowers. At the base of each flower is a bract, or reduced leaf, called the flowering glume, and at the base of each spikelet are commonly found two empty glumes. The axis or stem that carries the glumes is called the rachilla. Between the rachilla and the individual flower there is a small, nerved, membranaceous bract called the palea or palet. The glumes, which vary exceedingly in different species, may have awns (bristle-like appendages, as the 'beard' of wheat) or may be sharp-pointed or rounded, entire or toothed at their apexes.

All of these characters are of importance in determining the species of grasses. The arrangement of the spikelets in the head, as it is often improperly called, is varied. They may be sessile along the axis, as in wheat, forming a spike; they may all be arranged on one side of the axis or rachis, forming a raceme, or the rachis may branch widely into a panicle, as in oats, blue grass, etc., and there are many intermediate forms between these. According to their most common uses grasses may be divided into lawn, pasture, and hay grasses. Among the more common grasses suited to lawns are blue grass, Rhode Island bent grass redtop, Bermuda grass, Saint Augustine grass, and buffalo grass. Pasture grasses include: Redtop, blue grass, bent grass, fescue, orchard grass, brome grass, Bermuda grass, grama grass, rye-grass, blue-stem, and mesquit. Hay grasses include: Timothy, orchard grass, redtop, blue grass, brome grass, Johnson grass, tall oat-grass, meadow fescue, meadow foxtail, rye-grass, Guinea grass, crab-grass, crested dog's tail, etc. In addition many grasses are especially

GRASSES



1. TIMOTHY
2. SWEET VERNAL
3. KENTUCKY BLUE GRASS
4. GRAMA GRASS
5. ROUGH LEAVED GRASS

suited to binding sands and embankments. Grass-seed as usually obtained consists of the grain, with more or less chaff closely enveloping it. The seed proper consists of a small embryo, which lies at the base and nearly outside of the starchy endosperm, and the endosperm with its adhering pericarp. Upon the nature of the endosperm depends the great importance of some of the grasses in supplying various food-grains to man.

The following table represents Hackel's classification of grasses, which is now generally accepted by botanists, and by which the genera are grouped into thirteen tribes, in two series:

SERIES	Number of tribe	Name of tribe	Approximate number of species	Notable representatives of the tribes
Series A	I.	*Maydeæ*	20	Maize or Indian corn, teosinte, etc.
	II.	*Andropogoneæ*	400	Sugar-cane, sorghum, durra, lemon grass, etc.
	III.	*Zoysieæ*	25	Curly mesquite, galleta, *Zoysia*.
	IV.	*Tristegineæ*	35	Mostly tropical grasses of the Old World.
	V.	*Paniceæ*	650	Millets, *Panicum*, *Paspalum* *Pennisetum*, important tropical cereals, Guinea grass, etc.
	VI.	*Oryzeæ*	20	Rice, wild rice, etc.
Series B	VII.	*Phalarideæ*	60	Canary grass, ribbon grass, sweet vernal grass.
	VIII.	*Agrostideæ*	750	Timothy, redtop, meadow foxtail, and many other important pasture and fodder grasses.
	IX.	*Aveneæ*	300	Oats, oat grasses, soft grass, etc.
	X.	*Chlorideæ*	150	Bermuda, Buffalo, Grama, crowfoot grasses.
	XI.	*Festucaceæ*	775	Blue grass, fescue, orchard grass, brome grasses, teff, reed grass, chess, etc. Most important meadow grasses of temperate regions.
	XII.	*Hordeæ*	130	Wheat, rye, barley, important cereals of temperate zones, rye-grasses, wheat-grasses, etc.
	XIII.	*Bambusæ*	150	Bamboos, etc.

FEEDING VALUE OF GRASS.

Grasses of many kinds are used for pasturage, for soiling, and for hay. They constitute a very important group of feeding stuff for all farm animals. The feeding value of grasses commonly used for forage is shown by the average percentage composition of the following kinds: *Kentucky blue grass* contains: Water, 65.1 per cent.; protein, 4.1 per cent.; fat, 1.3 per cent.; nitrogen-free extract, 17.6 per cent.; crude fibre, 9.1 per cent.; ash, 2.8 per cent. *Fescue* contains: Water, 69.9 per cent.; protein, 2.4 per cent.; fat, 0.8 per cent.; nitrogen-free extract, 14.3 per cent.; crude fibre, 10.8 per cent.; ash, 1.8 per cent. *Timothy* (a hay grass) contains: Water, 61.6 per cent.; protein, 3.1 per cent.; fat, 1.2 per cent.; nitrogen-free extract, 20.3 per cent.; crude fibre, 11.8 per cent.; ash, 2.1 per cent. It will be seen that the three examples selected do not differ markedly in composition, and other grasses resemble them more or less closely.

Experiment has shown that about 64 per cent. of the total dry matter, 48 per cent. of the protein, 66 per cent. of the nitrogen-free extract, and 56 per cent. of the crude fibre of timothy is digested. Similar results have been obtained with other grasses. It may therefore be said that, judged by palatability, composition, and digestibility, grass fully deserves the high opinion in which it is held as a green fodder.

Like most green feeds, grasses have a high water content. Their feeding value depends largely upon the carbohydrates present (both nitrogen-free extract and crude fibre), though they also furnish an appreciable amount of protein. Like other succulent feeds, grasses have a value other than that derived from their composition, viz. they stimulate the appetite. The improvement often observed in the appearance of cattle when turned out to pasture in the spring is probably due in large measure to the fact that the appetite is increased by the succulent and agreeable flavor of the green feed, and thus the total amount of nutritive material consumed in a day is greater than when they are fed dry feeding stuffs. If pasturage is abundant cattle and sheep will not need other feed. If such is not the case, owing to drought or other causes, pasturage should be supplemented by other feeds. Generally speaking, grass increases in nutritive value until the seed is nearly ripe—that is, the plant continues to elaborate nutritive material until it has perfected its seeds. The plant then 'ripens'; that is, it ceases to form new nutritive material and by the action of rain, dew, sunlight, etc., loses more or less of that already formed. There may also be transfer of nutritive material from the stalks to the root. Some grasses, such as Bermuda grass, continue to grow throughout the season. Other grasses, e.g. buffalo grass, cure in their natural habitat without appreciable loss of nutritive material. Most pasture, lawn, and hay grasses make new growth if cut or eaten off by stock. See PASTURES, PASTURAGE; SOILING, SOILING CROPS.

FOSSIL GRASS. Fossil remains of grasses, recognized by their stems, leaves, flowers, and glumes, have been described from the Cretaceous and Tertiary rocks of America and Europe. Many of the Cretaceous species are of doubtful affinity with the grasses and more probably belong to other groups, such as the sedges (Cyperaceæ), and pond-weeds (Naiadaceæ). The genera Arundo and Phragmites are the most common forms in the Upper Cretaceous rocks. Among the Tertiary fossil grasses the most important is a species of bamboo (Bambusa) found in the Pliocene deposits of France, which is closely allied to the modern bamboos of the Orient.

BIBLIOGRAPHY. Hackel, *True Grasses* (English trans. New York, 1890); Baillon, "Monographie des Graminées," in *Histoire des Plantes* (Paris, 1893); Bentham and Hooker, in *Genera Plantarum* (London, 1883); Decandolle, *Monographia Phanerogamarum* (Paris, 1889); Vasey, *Monograph of the Grasses of North America* (Washington, 1892); Lamson-Scribner, *American Grasses* (Washington, 1899-1900); Beal, *Grasses of North America*, 2 vols. (vol. i., Lansing, Mich., 1887; vol. ii., New York, 1900);

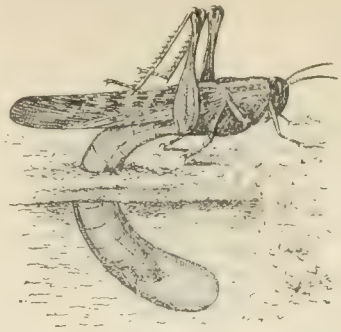
Sutton, *Permanent and Temporary Pastures* (London, 1888); Stebler and Schroter, *The Best Forage Plants* (trans. by McAlpine, London, 1889); Lamson-Scribner, *Grasses of Tennessee* (Knoxville, 1892-94); *Economic Grasses*, Bulletin 14, Division of Agrostology, United States Department of Agriculture (1898), and other Bulletins of the Division; Vasey, *The Agricultural Grasses and Forage Plants of the United States* (Washington, 1889).

GRASS-FINCH. One of the most widespread and familiar sparrows of North America (*Pooecætes gramineus*). It lives in the fields and grassy opens, making its nest between the grass-stems, and feeding upon seeds and insects. Its habit of singing pleasantly in the early evening led Wilson Flagg to bestow upon it the name 'vesper sparrow.' It had earlier been known as the 'bay-winged bunting,' on account of the rufous wing-coverts. It may be recognized among its brown and streaked congeners by the white outer feathers of its tail displayed in flight. See Plate of FAMILIAR SPARROWS; GRASSQUIT.

GRASS-FROG. The common European brown frog (*Rana temporaria*), which is highly variable in color, and possesses great power of color adaptation (metachrosis). It is essentially terrestrial in habits, and manifests many very interesting traits. Its range is extensive, covering all Central Europe and Asia to Japan, and rising to the height of 10,000 feet in the Italian Alps. It may become a most interesting and intelligent pet in captivity. "Next to man," says Gadow, "there is no animal which has been studied so minutely, and has had so many primers and text-books written upon it; in spite of all this, it is very little understood, thanks to its rather aberrant and far from generalized structure." One of the best and most easily accessible memoirs is Mivart's *The Common Frog*, a volume of the Nature Series (London and New York, 1874). The latest and best account of habits, etc., is by Gadow, *Amphibia and Reptiles* (London and New York, 1902). See FROG.

GRASSHOPPER. A popular term applied to certain orthopterous insects of the families Acridiidæ and Locustidæ. The English (including the English colonists) call the Acridiidæ 'locusts,' and the Locustidæ 'grasshoppers.' Americans use the term grasshopper for both, the Acridiidæ including the short-horned grasshoppers, and the Locustidæ the long-horned grasshoppers. The common grasshoppers of the fields, which are rather stout-bodied, with large hind thighs and strong powers of flight, belong to the Acridiidæ. They are frequently very destructive to crops; the Rocky Mountain grasshopper (*Melanoplus spretus*) damaged the grain crops of Colorado, Nebraska, and neighboring States in the years 1874 to 1876 to an extent of hundreds of millions of dollars, and reduced thousands of families almost to starvation. Allied species have done similar damage in the Argentine Republic, in South Africa, and in Algeria in recent years, and in Southeastern Europe in former times. The best remedial measures in use at present consist in late fall plowing, to break up the egg clusters; in dragging specially constructed coal-oil pans through the fields to collect the young grasshoppers; and in poisoning the insects by means of a bait consisting of moistened bran and arsenic.

The commonest species in the Eastern United States is the red-legged grasshopper (*Melanoplus femur-rubrum*), which quite closely resembles the destructive Western species, but which has shorter



GRASSHOPPER.
A female red-legged grasshopper depositing her eggs in the ground.

wings. Its eggs are laid in the autumn in a compact pod beneath the surface of the ground, and the young, which are hatched in the spring, molt four or five times, and reach the full-grown winged condition in late July or August. Some of the eggs in the North may hatch in the autumn, showing a tendency toward a second generation, which probably develops in the southern part of the range of this insect. The red-legged grasshopper sometimes occurs in such great numbers as to seriously damage pasture lands in the restricted localities. See LOCUST.

The long-horned grasshoppers (family Locustidæ) include those slender green forms with long antennæ called the 'meadow grasshoppers,' and also the interesting group ordinarily called katydids (q.v.), as well as the dark-colored wingless forms found under stones and in the woods and in caves and which are known as the 'cricket-like' grasshoppers, or 'cave crickets.' Another group belonging to this family contains certain hard-bodied insects of strange appearance, known as the 'shield-backed' grasshoppers, 'Western crickets,' or 'sand crickets.' One of the latter, belonging to the genus Stenopelmatus, is in the West supposed to be poisonous, although as a matter of fact it is perfectly harmless.

Fossil grasshoppers of the family Acridiidæ are known in fragmentary condition from rocks of as early age as the Lias of Switzerland and the Oölite of England, and members of the family Locustidæ have been found sparingly in the Jurassic limestones of Solenhofen, Bavaria. Several species of each family are known from the Tertiary rocks of North America and Europe, but none of either have been found in the amber. Nearly all the more important subdivisions of the two families mentioned are included among the Tertiary fossils. See ORTHOPTERA.

Consult: *First Report United States Entomological Commission* (Washington, 1877); Hyatt and Arms, *Insecta* (Boston, 1890); Scudder, *Guide to the Genera and Classification of the North American Orthoptera* (Cambridge, 1897); Howard, *The Insect Book* (New York, 1901). See also the bibliography under ORTHOPTERA.

GRASSHOPPER SPARROW. Any of two or three of the smaller American sparrows which live in grassy fields, and whose rattling notes

resemble those of a locust or a 'grasshopper.' The commonest one is the yellow-winged sparrow (*Ammodramus passerinus*), which is about five inches long, pale brown and streaked in color, with the front edge of the wing conspicuously yellow, and which conceals itself most of the time in the field and roadside herbage. See SPARROW.

GRASSHOPPER WARBLER. A European warbler (*Locustella nævia*), common in Great Britain. It haunts the reedy banks of streams, where it conceals itself and its nest with great skill among the herbage. Its notes are almost the same as those of a locust. It appears erroneously in many books as 'grasshopper lark,' but is of the family Sylviidæ, and not at all related to the larks.

GRASSI, grâs'sê, BATTISTA. A Sicilian naturalist, professor of zoölogy in the University of Rome. Several years were devoted by him to the bionomics and life-history of the white ants (Termitidæ). He discovered (1893-96) that the young are all born alike, and that the differences between the workers, etc., when heredity or selection does not operate, result from differences in the food. He also proved that an individual can by change of food be made into a soldier after it has visibly undergone one-half or more of its development into a winged sexual form. He, with Calanduccio, proved in 1887-96, what had already been suspected in 1864 by Gill, that a minute fish, Leptocephalus, is the larva of the eel, and that females of eels can mature only in depths of at least 500 meters. For these discoveries he was elected a foreign member of the Royal Society of London. His researches, made in 1898-1900, on the sporozoan malarial parasite of the mosquito (see SPOROZOA) are of great scientific and practical value. He independently proved that the mosquito (Anopheles) transmits malaria, and that, by the use of wire gauze as a covering for windows, doors, and chimneys of houses, the worst malarial regions of Italy can be rendered as healthy as any other part of the country. He also proved the transmission of filariæ of the blood by the same Anopheles (*Anopheles claviger*) which is the host of this micro-parasitic worm.

GRASSLANDS. One of the three great climatic landscape types—deserts, forests, grasslands—into which Schimper, in his work on plant geography, divides the world. It is not yet clearly known what determines the presence of trees or of grasses in a given locality. Schimper, perhaps, has the most tenable hypothesis for the origin of grasslands, viz. that they occur in regions where dry winter winds preclude the presence of forests. Since grasses are shallow-rooted, they do not require a moist subsoil, such as trees do, and since they are of low stature, they are protected from the desiccating influence of wind. The greatest development of grasslands is in the temperate zone, and commonly in Continental interiors. Ecologically speaking, the pure climatic grasslands of the world are essentially similar, though the species found in them vary with the country. In different lands, as is well known, they have various names, of which those that have come to be of most importance to students of phytogeography are prairie, steppe (qq.v.), and pampas. One speaks of the pampas of Argentina, the prairies of North America, and the steppes of Europe and Asia. In all these, however, the general life-conditions are similar, and there is no essential reason for more than one title. A type of formation which differs essentially from that just described is the savanna (q.v.), which is intermediate between forest and grassland, and is located in a transitional climate. Many of the llanos and campos of Northern South America are true savannas, while others are essentially grasslands. In general, savannas are as characteristic of tropical regions as pure grasslands are of temperate. Again, there are edaphic grasslands, e.g. river meadows and swamps of lake origin. Through the influence of man, many artificial grasslands are to be found, e.g. pastures and most meadows. Perhaps edaphic river savannas are to be classed here also. See DISTRIBUTION OF PLANTS.

GRASSMANN, gräs'mân, HERMANN GÜNTHER (1809-77). A German mathematician and Sanskrit scholar, born at Stettin. He was a son of Justus Günther Grassmann (died 1852 at Stettin), who was well known for his work in crystallography. The young Grassmann devoted his attention at first to theology and philosophy, which he began studying in Berlin in 1827. He then turned his energies to mathematics, which he taught successively at the industrial school in Berlin, at the Ottoschule in Stettin, and at the Stettin Gymnasium. He is known chiefly for his work *Die Wissenschaft der extensiven Grössen oder die Ausdehnungslehre* (1844, and later editions). The obscure style of this treatise was such as to cause the first edition to pass practically unnoticed, and it was not until the theory of quaternions (q.v.) began to be recognized that Grassmann's allied theory attracted attention. In later life he took up the study of Sanskrit, and published a *Wörterbuch zum Rigveda* (Leipzig, 1875), which is a remarkable example of a combined dictionary and concordance, and is still indispensable to all Sanskrit scholars, and an *Uebersetzung des Rigveda* (2 vols., 1876-77), which is based on the principles of the so-called linguistic school of Vedic interpretation, and is likewise a work of much value. Grassmann was also the discoverer of one of the most important laws of comparative linguistics, which is still known as Grassmann's law (q.v.). His other works include the following: "Neue Theorie der Elektrodynamik" (Poggendorff's *Annalen*, vol. 64); "Theorie der Farbenmischung" (same journal, vol. 89); *Geometrische Analyse, geknüpft an die von Leibniz erfundene geometrische Charakteristik* (1847); *Lehrbuch der Arithmetik und Trigonometrie* (1861-65). A collection of his works on mathematics and physics was published at Leipzig in 1894. Consult Schlegel, *H. Grassmann, sein Leben und seine Werke* (Leipzig, 1878).

GRASSMANN, ROBERT (1815-1901). A German mathematician, a brother of Hermann Grassmann (q.v.). He was born at Stettin. After devoting himself for several years to teaching, he went into journalism, and became associated as writer with the *Stettiner* and the *Pommersche Zeitung*. His researches, especially those on the theory of arithmetic, are important, and reveal considerable originality. He also wrote a number of works on special sciences, including: *Die Formenlehre oder Mathematik* (1872);

Die Weltwissenschaft oder Physik (1862-73); *Die Lebenslehre oder Biologie* (1872); *Die Wissenschaftslehre oder Philosophie* (1876); *Das Weltleben oder die Metaphysik* (1881); and *Das Pflanzenleben* (1882).

GRASSMAN'S LAW. A phonetic law, formulated by Hermann Grassmann (q.v.) in 1863, regarding the aspirated mutes or explosives of the Indo-Germanic consonant system. This law he defined thus: If an Indo-Germanic root had originally two aspirated mutes, only one aspirate was retained in Indo-Iranian and in Greek. There seems to be no law as to which aspirated mute shall be retained. Examples of the phenomenon explained by the law are very numerous. Thus there may be cited Skt. *kumbha*, Gk. κύμβος: Av. *xumba*, pot; Skt. *gabhasti*, arm; Lat. *habere*, to have; Lat. *fingere*, to form; Goth. *deigan*, to knead; Skt. *bāhu:* Gk. πῆχυς, arm; Skt. *budhna*, Gk. πυθμήν: Lat. *fundus*, bottom; Skt. *sahatē*, Gk. ἔξειν for Gk. *ἔκ-σειν: ἔχειν, to have; Gk. θρίξ: plural τρίχες, hair; Skt. *duhitar:* Gk. θυγατήρ, Goth. *daúhtar*, daughter; and many others. The law appears very clearly in the reduplication of Sanskrit and Greek verbs which have an initial aspirate mute. Thus Skt. *chanduti*, pleases: perfect *cachanda;* Skt. *bhavati*, Gk. φύει, becomes: perfect *babhūva*, πέφυκα; Skt. *bhujati*, Gk. φεύγει, bends, flees: perfect *bubhōja*, πέφευγα; and the like. By the operation of onomatopœia, inflection, assimilation, and so forth, many words violate the principle involved in Grassmann's law, as Skt. *jharjhara*, drum, *kumbhābhis*, with pots, Gk. λιθωθῆναι, to be stoned, θηθίς, aunt, beside the literary τηθίς. The Sanskrit grammarians were already familiar with this principle, and the Greek scholar Buttmann (q.v.) also had made such explanations as τρέφειν, θρεψειν, from *θρεφ-, before Grassmann, who, however, by his exact enunciation of the law, is rightly accredited with the full discovery of the principle. See PHONETIC LAW.

GRASS-MOTH. A family (*Crambidæ*) of small moths, of which the species are numerous, inhabiting pastures, where they are often seen to rise in great numbers when disturbed, and soon to settle again on the blades of grass. Their form, when their wings are closed, is long and narrow, pointed at the head, abruptly cut off at the opposite end. They are often brown and white, sometimes silvery and golden.

GRASS-OIL. A fragrant volatile oil obtained from the leaves and stems of certain grasses of the genus Andropogon, natives of India. The *Andropogon Iwarancusa* yields a colorless or yellowish oil. The oil derived from the *Andropogon Schœnanthus* is colored green by a trace of copper usually present as an impurity. The principal chemical constituent of the oil is the monatomic alcohol $C_{10}H_{18}O$, called geraniol. Grass-oil is often met with in commerce under the names of *oil of citronella* and *lemon-grass oil.* It is used in scenting coney soap and to adulterate rarer varieties of fragrant oils.

GRASS-OWL. A typical owl (*Strix candida*) of India and eastward, resembling the barn-owl, and almost invariably found in long grass.

GRASS-PARRAKEET. See PARRAKEET.

GRASS-PICKEREL. The common small pike (*Lucius reticulatus*) of the Eastern United States. See PICKEREL.

GRASSQUIT (from *grass* + *quit*, apparently imitative of the note). A diminutive finch or seed-eater (q.v.) of the genus Sporophila (or some closely allied genus), abundant in the warmer parts of America and in the West Indies. The grassquits are only about four inches long, and are not bright-colored, black, white, olive, and gray being the predominant shades. They feed on seeds, and have very little power of song. But they are interesting and sociable little birds, and are frequent around houses. They build large domed nests, and lay five or six speckled eggs. They are also called 'pygmy finches,' and 'grass-finches.'

GRASS-SNAKE (so called from its home). (1) One of the garter-snakes (q.v.). The name especially applies to the unstriped greenish-brown variety of *Eutœnia sirtalis*, called *ordinata* by Cope, which has been regarded as a distinct species by other writers. The typical yellow and black longitudinal stripes, are nearly or quite wanting; but three series of small, square, dark blotches run along each side. The abdomen is greenish white, with black spots near each end of the abdominal scales. The greensnake is sometimes called 'grass-snake.'

(2) The common European species of water-snake, so called in Great Britain, where it is the only serpent except the adder. See WATER-SNAKE.

GRASS-SNIPE. A name among American gunners for several shore-birds frequenting grassy places, most commonly perhaps for the pectoral sandpiper or 'jack snipe' (*Tringa maculata*). See SANDPIPER.

GRASS-SPONGE. A commercial name for several North Indian sponges (allied to the sheepswool and velvet sponges), which grow upon hard bottoms among the eel-grass, and are marked outwardly by vertical ridges. One is *Spongia graminea;* another, *Spongia equina*, exhibits a puzzling number of varieties. All of the grass-sponges are of inferior quality.

GRASS STAGGERS. Cerebro-spinal meningitis. See MENINGITIS.

GRASS-TREE (so called from the grass-like foliage), *Xanthorrhœa*. A genus of the natural order Juncaceæ, natives of Australia, Tasmania, and New Zealand, which constitute a very peculiar feature in the vegetation of that part of the world. There are six or eight species, of which the widest known are *Xanthorrhœa arborea*, *Xanthorrhœa pumilo*, *Xanthorrhœa Tateana*, and *Xanthorrhœa hastilis*. They have upright stems, which bear tufts of long narrow foliage at the summit, somewhat resembling small yuccas; a long cylindrical spike of densely aggregated flowers surmounts the centre of the tuft of leaves. The base of the inner leaves of some species is edible, and forms, particularly when roasted, an agreeable article of food. The centres contain as much as 5 per cent. of sugar, which has been utilized to some extent. All the species abound in a resinous juice, which, on exposure to air, hardens into a reddish-yellow, inodorous substance, with a shining fracture, soluble in alcohol, and useful as a tonic in dysentery, diarrhœa, and other intestinal maladies; used also by the natives of Australia for uniting the edges of wounds, and with a clayey earth for calking their canoes, and as a cement for various pur-

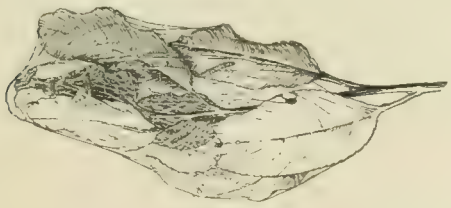
poses. This substance, usually called grass-tree gum, burns brightly, and has been used for candles. If treated with nitric acid, it is almost completely transformed into picric acid, and it was thus employed before the process of making picric from carbolic acid had been discovered. Grass-tree gum has also been used for making colored varnishes. The common grass-tree (*Xanthorrhœa hastilis*) has a stem about four feet high, but sometimes a foot in diameter. It is of very slow growth, and is supposed to be several centuries old when it has reached such dimensions. Several species are found in Eastern Australia, where their leaves are used as fodder for all kinds of cattle.

GRASS-TREE GUM. See GRASS-TREE.

GRASS VALLEY. A city in Nevada County, Cal., 69 miles north by east of Sacramento; on the Nevada County Narrow Gauge Railroad (Map: California, C 2). It has a public high-school library, Mount Saint Mary's Academy, and Grass Valley and Saint Patrick's orphan asylums. The city is in the richest gold quartz-mining region of California, and has extensive mining interests, quartz mills, marble and granite works, winery and distillery, etc. Grass Valley was settled in 1849, and incorporated in 1861. Population, in 1900, 4719.

GRASS-WARBLER. One of the small insect-eating timaline birds of the African genus Cisticola. It resembles the finches in its ground-keeping habits and metallic notes, from which it has the name 'pinc-pinc,' sometimes used. The group is allied to the tailor-birds, and all the species build remarkable nests. See FANTAIL.

GRASS-WORM. A common insect of the Southern United States, which injures the grasses and small grains. It is the larva of a noctuid



GRASS-WORM.

moth (*Laphygma frugiperda*), and is therefore allied to the cut-worms (q.v.). It frequently occurs in enormous numbers, and marches in armies, from which habit it is sometimes called the 'Southern army-worm,' in contradistinction to the Northern army-worm (*Leucania unipuncta*). See ARMY-WORM.

GRATE (from ML. *grata*, variant of *crata*, grating, crate, from Lat. *cratis*, hurdle; connected with Gk. *κύρτη*, *kyrtē*, fishing-basket, Skt. *kart*, to spin). The iron bars constituting the floor of a fire-box or furnace, on which the fuel rests, and through which it receives its supply of oxygen for combustion. The iron cage which holds fuel, especially coal, in a fireplace is also called a grate. See FURNACE and BOILER.

GRATEFUL SERVANT, THE. A comedy by James Shirley licensed in 1629, under the title of *The Faithful Servant*, and printed in 1630. It was revived in 1667. It is said eleven commendatory verses were written on its publication, one of which was by Massinger.

GRATIÆ, grā'shī-ē. See CHARITIES.

GRATIAN, grā'shi-an (Lat. *Gratianus*). The collector of the well-known body of canon law commonly cited under the title of *Decretum Gratiani*. In spite of the fact that he was the most celebrated canonist of the Middle Ages, and was styled 'the master,' little is known of his life. He lived in the first half of the twelfth century, was a monk in the Monastery of Saint Felix at Bologna, and probably a teacher of canon law at Bologna. The *Decretum* is his only known work. The many details which have been added to this bare outline of his life are legendary. Although he was uncritical in the use of his sources, his ability is clearly apparent in his works. No other private compilation has exercised so great and so enduring an influence. The official *editio Romana* of the *Decretum* (1582) was prepared after the Council of Trent by a committee of cardinals; there is a critical edition by Friedberg in his *Corpus Juris Canonici* (Leipzig, 1879). See CANON LAW.

GRATIANO, grā'shī-ä'nō. (1) The stock 'bore' of Italian comedy. (2) The friend of Bassanio and lover of Nerissa in Shakespeare's *Merchant of Venice*. (3) The brother of Brabantio and uncle of Desdemona in Shakespeare's *Othello*. He is the only character who benefits by the tragedy, since he falls heir to the Moor's possessions.

GRATIANUS, grā'shī-ā'nŭs (?-407). A Roman general, whom the Roman legions in Britain proclaimed Emperor in opposition to Honorius. At the end of four months he was put to death by his soldiers, in the year 407.

GRATIANUS AUGUSTUS (A.D. 359-383) (Roman Emperor A.D. 367-383). Eldest son of Valentinian I., by his first wife, Severa. He was born at Sirmium, in Pannonia. While he was still *nobilissimus puer*, or heir apparent, he was created consul, and in 367 was elevated by his father to the rank of Augustus (joint Emperor) at Ambianum (Amiens), in Gaul. In the following year he accompanied his father in his expedition against the Alemanni, in order that he might be accustomed to warfare. On the death of Valentinian, Gratianus became senior ruler of the Western Empire, taking as a colleague his half-brother Valentinian II. Gaul, Spain, and Britain fell to Gratianus's share; and as his brother was only four years old he was practically the sole ruler in the West, fixing his residence at Treviri (now Trèves), while the East continued to be ruled by his uncle, Valens. During the first part of his reign a fierce warfare was carried on against the tribes who possessed the Danubian Provinces and Illyricum; and he was on the point of marching into Thrace, to assist Valens against the Goths, when he was suddenly called upon to defend his dominions against the Lentienses, a tribe of the Alemanni. After the invaders had been defeated Gratianus advanced toward the Eastern Empire, but while on the way he learned that his uncle Valens had been defeated and killed by the Goths near Adrianople (August 9, 378). The sovereignty of the Eastern Empire then devolved upon Gratianus, but, feel-

ing his inadequacy to the task of ruling the whole Empire, he recalled Theodosius (q.v.) from Spain, and appointed him his colleague on January 19, 379. Gratianus possessed some admirable virtues, but his character was yielding and pliant, and he was often led to the commission of acts of cruelty and tyranny. His persecution of the pagans, and afterwards of heretic Christians, alienated the affections of his subjects generally, while his fondness for frivolous amusements and unworthy associates excited the contempt of the army, so that when Maximus was proclaimed Emperor by the legions in Britain, crowds of the disaffected flocked to his standard. Gratianus was defeated by him near Paris, and afterwards fled to Lugdunum (Lyons), where he was overtaken and killed by Andragathius, whom Maximus had sent in pursuit of him, on August 25, 383. For the reign of Gratianus, see Gibbon's *Decline and Fall of the Roman Empire*, ed. Bury, chs. 25-27.

GRATING, DIFFRACTION. See DIFFRACTION AND DIFFRACTION GRATINGS; DIVIDING ENGINE; LIGHT.

GRATI'OLA (Neo-Lat., from Lat. *gratia*, grace). A genus of plants of the natural order Scrophulariaceæ. *Gratiola officinalis*, a species with sessile lanceolate serrulated leaves and axillary solitary flowers, is sometimes called hedge-hyssop. It is found in meadows and on the margins of ponds and river-banks in most parts of Europe, where it is said to render some of the meadows useless as pastures on account of its extreme bitterness, and its violent action as a purgative, diuretic, and emetic. In overdoses it is an acrid poison. Formerly it was so highly esteemed as a medicine that the name of *Gratia Dei* (grace of God) was given to it, and for the same reason it is known in France as *herbe au pauvre homme* (poor man's herb). It is said to be the basis of the famous gout medicine called *eau médicinale*. *Gratiola peruviana*, a South American species, has somewhat similar properties. These properties are supposed to depend upon a bitter resinous principle called gratioline. A number of species are common in the United States, but none appear to be of economic importance.

GRATRY, grä'trē', AUGUSTE JOSEPH ALPHONSE (1805-72). A French Roman Catholic theologian, born at Lille. He was educated at the Ecole Polytechnique; became director of the Collège Stanislas, Paris, in 1842, and five years later almoner of the Superior Normal School. In 1852 with others he reconstituted the Oratory of the Immaculate Conception, a society devoted to the instruction of youth. He became Vicar-General of Orléans in 1861, and professor of ethics in the Sorbonne two years later, and in 1867 was made a member of the Academy. Père Gratry was a warm friend of Père Hyacinthe, but did not share in the latter's extreme views on church questions. During the Council of the Vatican he published four letters in opposition to the opportuneness of defining Papal infallibility. These acts brought about his retirement from the Oratory in 1869, but when the dogma was promulgated he accepted it. His works are: *Cours de philosophie* (6 vols., 1855-57); *Les sophistes et la critique* (1864); *Jésus-Christ* (1864), addressed to Renan; and *La morale et la loi de l'histoire* (1868). Consult Chauvain, *Life of Abbé Gratry* (Paris, 1901).

GRATTAN, grăt'an, HENRY (1746-1820). An Irish statesman and orator. He was baptized at Dublin, July 3, 1746, and presumably was born a few days before. His father was recorder of Dublin, and member of Parliament for that city until his death, in 1776. In 1763 Grattan entered Trinity College, Dublin, and four years later took his bachelor's degree, became a student at the Middle Temple in London, and in 1772 was admitted to the Irish bar. Politics attracted Grattan, and in 1775 he was returned to the Irish Parliament as member for the borough of Charlemont. He became the leader of the popular cause, demanding free trade for Ireland; and when this had been obtained temporarily, he demanded that the laws made by the Irish Parliament should no longer be subject to the revision of the English Parliament. On April 19, 1780, he made his famous speech in favor of this measure. Two years later (1782) these demands also were granted, chiefly through the continual efforts on the part of Grattan. He lost his popularity, however, when he opposed Flood's demand that a final renunciation of the principle of Irish dependence should be demanded, and only regained popular favor after he opposed Pitt's commercial measures. He spent thereafter many years urging the removal of all disabilities as regards Catholics, but was unsuccessful. When in 1797 Ulster was put under martial law, and Grattan's protests were unavailing, he withdrew from Parliament. He returned to Parliament in 1800 with the express purpose of opposing the proposed union between Great Britain and Ireland. His speeches were most eloquent, but they availed nothing. In 1805 he was persuaded to accept a seat in the Parliament in London, and labored there also for Catholic emancipation until his death, which occurred in London on June 4, 1820. Grattan's public and private character was unimpeachable, and as an orator he stands in the first rank, his style being rapid, and rich in antithesis and poetic suggestiveness. Consult: Henry Grattan (son), *The Speeches of the Right Honorable Henry Grattan in the Irish and in the Imperial Parliament* (4 vols., London, 1882); *Memories of the Life and Times of Henry Grattan* (new ed., London, 1849); *Compendium of Irish Biography* (Dublin, 1878); Dunlop, *Life of Henry Grattan* (London and Philadelphia, 1899).

GRATTAN, THOMAS COLLEY (1792-1864). An English author. He was born in Dublin. He lived mostly abroad. Because of his brilliant articles to the London *Times* from Brussels, he was appointed British consul to Massachusetts (1839). He took an important hand in the Ashburton treaty (1842). His many romances in verse and prose met with considerable success; but he was mainly known by *Highways and Byways* (three series, 1823, 1825, 1827), an account of his travels, written at the suggestion of Washington Irving.

GRAT'TIUS FALIS'CUS. Roman poet, contemporary of Vergil, and author of a poem upon the chase entitled *Cynegetica*. Of the poem 541 hexameters have come down through one manuscript, discovered in France in the beginning of the sixteenth century, and in 1654 it was translated into English verse by Christopher Wase. See Bähren's *Poetæ Latini Minores*, vol. i., pp. 31-53.

GRATZ, or **GRAZ,** grätz. The capital of the Austrian Crownland of Styria, picturesquely situated in a beautiful region, on both sides of the Mur, about 140 miles southwest of Vienna by rail (Map: Austria, D 3). The inner town, on the left bank of the river, connected with the town on the right bank by seven bridges, is built around the Schlossberg, formerly a strongly fortified hill, and since the destruction of the fortifications by the French in 1809 laid out in charming pleasure grounds. The view is famous from the Schlossberg, which is ascended by a cable railway. The city park is located on this hill, and is a noteworthy example of the English style. The old bastions of the city have nearly disappeared. Among the more notable buildings are the Gothic cathedral, completed in 1462, and interesting on account of its fine stained-glass windows, altarpieces, and reliquaries (the adjoining mausoleum with an ornate façade contains the tomb of Emperor Ferdinand II.); the parish church, with a fine altarpiece by Tintoretto; an ancient Gothic church of the Teutonic Knights, dating from the thirteenth century; the splendid Renaissance Landhaus, or Hall of the Estates, the place of assembly of the Styrian Diet, dating from 1569; the arsenal, with a large and excellent collection of ancient weapons, and the Imperial palace, built in the eleventh century. Among the more modern buildings are the German Renaissance Rathaus, the university buildings, the law courts, the museum, and the Joanneum, with an important natural-history collection and other collections, and a library of 140,000 volumes. There are noteworthy monuments to Francis I. and Archduke John.

Gratz is well supplied with educational institutions, having in addition to the university (see GRATZ, UNIVERSITY OF) a technical high school, several gymnasia, and industrial and trade schools. The provincial picture gallery includes examples of Tintoretto and Cranach. The charitable institutions are numerous and well equipped, and there are several art and scientific associations. Gratz has important and rapidly growing manufactures of steel and iron products (especially steel rails), leather, paper, woolen cloths, hats, perfumery articles, excellent champagne, etc. There are extensive railway shops, an important book and publishing company, and large savings banks. Owing to its position on the direct railway line between Vienna and Triest, Gratz is favorably situated as an intermediary station for the trade between the Austrian capital and the Adriatic provinces. It is the seat of the superior courts for Styria, Carinthia, and Carniola, and of the Prince Bishop of Seckau. Population, in 1890, 112,069; in 1900, 138,370. The environs are delightful, offering fine views and interesting excursions.

Gratz first appears in 1129, though its origin undoubtedly goes back to a far earlier date. In the fifteenth century it was the favorite residence of the Roman Emperors, and later became a strong centre of resistance to Turkish conquest. It was occupied by the French in 1797, 1805, and 1809. Since 1860 it has developed rapidly. Consult Gsell Fels, *Graz und seine Umgebung* (3d ed., Munich, 1898).

GRATZ, UNIVERSITY OF. A university of Styria, Austria-Hungary, founded as a Jesuit college in 1573. After a somewhat checkered career, culminating in the eighteenth century, it was reorganized in 1826, 1849, and 1863, and is, in 1903, the fourth in importance of Austrian universities. It comprises faculties in theology, law, medicine, and philosophy. Its library is especially rich. The number of students in 1901 was 1650.

GRAU, grou, MAURICE (1849—). An operatic manager, born in Brünn, Moravia, but a resident of the United States after 1854. He was educated in the schools of the city of New York, and afterwards graduated from the College of the City of New York, then known as the Free Academy. He entered the service of his uncle, who was a well-known operatic and dramatic manager; and made his own first venture as an impresario by bringing Aimée to the United States in 1872. The following year he organized the Kellogg English Opera Company, and also instituted a series of dramatic performances, starring Salvini, and acting as Rubinstein's manager. In 1897 the Maurice Grau Opera Company was formed and incorporated, and he became the manager of the Metropolitan Opera House, New York, which position he resigned in 1903. He was also appointed manager of the Royal Opera in Covent Garden, London, being succeeded, however, in 1901 by André Messager.

GRAU, MIGUEL (1834-79). A South American naval officer, born at Piura, Peru. He studied in the naval school at Callao, entered the Peruvian Navy as midshipman in 1852, and was appointed to the command of the turret-ship *Huascar* in 1871. Subsequently he was a Deputy in the Peruvian Congress, and director of the Naval Academy. In 1879, upon the outbreak of the war with Chile, he entered active service as rear-admiral, and with the ironclads *Huascar* and *Independencia* as the chief part of his fleet for a time maintained a successful warfare against the Chilean Navy. He lost the *Independencia* by foundering in an attack upon the blockading vessels at Iquique, and afterwards was attacked in the *Huascar* off Point Angamos by two Chilean ironclads. He was killed by the explosion of a shell, and the *Huascar* was compelled to surrender. A memorial to Grau was erected by the nation at Lima.

GRAU, RUDOLPH FRIEDRICH (1835-93). A German Lutheran theologian. He was born at Heringen-on-the-Werra, and was educated at Leipzig, Erlangen, and Marburg, where he became a member of the faculty in 1865. In 1866 he accepted a chair in the University of Königsberg. His numerous works, chiefly on race influence in religion, the importance of faith, and kindred subjects, include: *Semiten und Indogermanen in ihrer Beziehung zu Religion und Wissenschaft* (2d ed. 1867); *Bibelwerk für die Gemeinde* (with several other Lutheran clergymen, 2d ed. 1889); *Die Judenfrage und ihr Geheimnis* (1881); *Luthers Katechismus erklärt aus biblischer Theologie* (1891); *Zur Inspirationslehre und zum ersten Kapitel der Bibel* (1892). Several of his works on faith, such as *Der Glaube die wahre Lebensphilosophie* (1881), were translated into English for missionary schools.

GRAUBÜNDEN, grou'bun'den. The easternmost canton of Switzerland. See GRISONS.

GRAUDENZ, grou'dents. A town of Prussia, in the Province of West Prussia, situated on the

right bank of the Vistula, 60 miles south of Danzig (Map: Prussia, II 2). It is commanded by a citadel, erected in 1772-76 by Frederick the Great, and is surrounded by a wall. It is a well built town with a gymnasium, two seminaries, and other educational and charitable institutions. The chief manufactures are machinery and other iron products, cigars, and brushes. There are also a number of sawmills. Population, in 1890, 20,385; in 1900, 32,727, of whom 10,000 are Catholics. Graudenz, under the name of Grudenc, received municipal rights in 1291. It came into the possession of Poland in 1466, was occupied in 1655-59 by the Swedes, and annexed to Prussia in 1772.

GRAUL, groul, KARL (1814-64). A German missionary, born at Wörlitz near Dessau. After conducting the Lutheran mission at Dresden he went to India in 1849, where he studied the Tamuli language, and devoted himself to missionary labor until 1853. His principal publications are: *Unterscheidungslehren der verschiedenen christlichen Bekenntnisse* (11th ed. 1884); and *Bibliotheca Tamulica* (1854-65). He was a reformer in the best sense of the term. Free from bigotry, he believed, not so much in the conversion of the individual as in the Christianizing of the people at large, and to this end urged the necessity of broad and liberal culture on the part of the missionary.

GRAUN, groun, KARL HEINRICH (1701-59). A German composer, born at Wahrenbrück, near Torgau, Prussian Saxony. When Frederick the Great came to the throne of Prussia he appointed Graun royal musical director, and commissioned him to organize an opera at Berlin, the singers for which were secured in Italy. For a long period the operas of Graun—about thirty in number—were performed at Berlin, to the exclusion of almost all others, excepting those of Hasse. Even more celebrated was the oratorio on the Passion, entitled *Der Tod Jesu*, which is still given annually in Berlin. Among his most noteworthy compositions, all of which are full of melody, are the following: *Ifigenia in Aulide* (1729); *Artaserse* (1743); *Semiramide* (1754); *Montezuma* (1755); the splendid *Te Deum* (1756); and numerous cantatas, motets, concertos, etc. Graun is represented as musical director upon the famous monument of Frederick the Great in Berlin.

GRAVE (AS. *græf*, *graf*, Goth. *graba*, OHG. *grab*, Ger. *Grab*, from AS. *grafan*, Goth., OHG. *graban*, Ger. *graben*, Eng. *grave*, to dig). The place where a dead body is interred. It is protected by the common law from violation by removing or disturbing the dead body, or stealing the coffin or grave-clothes, such violation being punished as a misdemeanor, under the description of *grave-robbing*, or *body-snatching*. The common-law rule has been supplemented and reënforced by statutory provisions in some of the United States. See CEMETERY LAWS; CORPSE.

GRAVE (It., heavy). In music, an Italian term denoting a very slow tempo of serious character. It is employed very much like the largo (q.v.).

GRAVE, THE. A didactic poem of nearly 800 lines in blank verse, by Robert Blair. It was published in 1743 and in 1808. William Blake made a series of designs illustrating the poem, among his best and most successful work.

GRAVEAIRS, grāv'ârz, LADY. A character in Cibber's comedy *The Careless Husband*.

GRAVEDIGGER. A common name in India for the ratel or honey-badger (see BADGER), which has the reputation of digging into men's graves in order to feed on the corpses—a belief for which there is no justification in fact. Persians make the same accusation against their badger.

GRAVEL. See CALCULUS.

GRAVEL (OF. *gravele*, *gravelle*, *grevelle*, from *grave*, *greve*, Fr. *grève*, sand; connected with Welsh *gro*, Corn. *grou*, MBret. *grouauenn*, sand; ultimately connected with Skt. *grāvan*, stone). The name given to aggregations of water-worn and rounded fragments of rocks, varying in size from a pea to a walnut. When the fragments are smaller the deposit is sand, when larger it is called shingle. Gravel deposits are formed by the action of running water, and are usually limited in size, occurring with more extensive strata of sand. They are found in the formations of every age. By infiltration of silica, lime, or iron oxides, the pebbles may be firmly cemented together, and form a hard rock called conglomerate (q.v.). Quartz, owing to its resistance to abrasion, is the most common mineral found as gravel. See GEOLOGY; SOIL.

GRAVELINES, grâv'lên' (Flem. *Gravelinghe*, Ger. *Gravelingen*). A small fortified town and seaport of France, in the Department of Nord, about 10 miles southwest of Dunkirk. Population, in 1900, 6202. The town was founded about 1160, and after 1405 constituted a part of the possessions of the House of Burgundy. It is noted as the scene of a victory gained July 13, 1558, by the Spanish troops under Count Egmont over the French under Marshal Thermes, a victory which compelled the French to accept the severe terms of the Treaty of Cateau Cambrésis (1559). In 1658 Gravelines was taken by Turenne, and was incorporated with France by the terms of the Treaty of the Pyrenees (1659).

GRAVELOTTE, grâv'lôt'. A village in Lorraine, about seven miles west of Metz, which has given its name to the most important battle of the Franco-German War, fought on August 18, 1870. It was the third in the series of battles around Metz, following on Bazaine's attempt to retreat from the Moselle to Châlons and to effect a junction with the army of MacMahon. The battles of Colombey-Nouilly (August 14th) and Vionville, or Mars-la-Tour (August 16th), prevented the execution of this plan, and Bazaine, in fear of being cut off from Metz, fell back upon that fortress on August 17th, taking up an exceptionally strong position on a ridge of hills to the west of the city, and fronting westward, with his line extending from Rancourt and Saint-Privat on the north through Amanvillers and Chatel to Rozerieulles. In German headquarters, where great uncertainty prevailed as to the exact position of the French, it was determined to attempt a flanking movement against the enemy's right, which was supposed to be at Amanvillers; at the same time the French left and centre were to be assailed to insure the success of the attack on their right. As it turned out, however, the French right extended some three miles to the north of Amanvillers, and the execution of the flanking

movement was thus delayed. A premature attack on the French centre and left which was begun about noon at Vernéville was checked by a withering fire from the French, the irregular nature of the terrain making the advance of the German infantry exceedingly difficult. An ill-advised charge by the First Cavalry Division was repulsed and served only to throw the German right for a time into confusion; and though by nightfall the Germans had succeeded in carrying the heights of Moscou, Saint-Hubert, and Point-du-Jour, the fighting in that quarter attained no decisive point. The outcome of the battle was decided on the French right, where the flanking manœuvre of the Germans, though delayed, was finally carried out. Saint-Privat was carried by the Guards and Saxon troops at 7 o'clock in the evening, and the French right was driven from its position with immense loss. In the night Bazaine fell back upon Metz, abandoning all hope of joining MacMahon. The German forces engaged, which consisted of the armies of Steinmetz and Prince Frederick Charles, and which were commanded by King William in person, numbered about 205,000 officers and men, and suffered a loss of more than 20,000 in killed and wounded. The French out of 130,000 engaged lost nearly 600 officers and more than 13,000 men. The battle is often known as the battle of Saint-Privat.

GRAVELROOT. A North American medicinal plant. See EUPATORIUM.

GRAVENREUTH, grä'ven-roit, KARL, Baron (1858-91). A German traveler in Africa. He was born in Munich. In 1886 he founded the station of Korogwe in Usambara for the German East Africa Company. Afterwards he took an active part in subjugating the Arab revolt at Bagamoyo, and in 1890 was appointed commander of an exploring expedition through southern Kamerun, where he met his death in an encounter with the natives. In recognition of his valor and of his valuable services to the Government, a monument was erected to him at Kamerun.

GRAVES, ALFRED PERCEVAL (1846—). An English poet, born in Dublin. He was educated at Trinity College, Dublin; held important positions in the civil service, and was made inspector of schools in 1874. He contributed to the periodicals and did much for Irish song and music. Among his volumes are: *Songs of Killarney* (1872); *Irish Songs and Ballads* (1879); and subsequently *Songs of Irish Wit and Humour* (with Dr. C. Wood) (1884); *The Irish Song Book* (1894); *Irish Folk Songs; Songs of Erin* (with Dr. C. V. Stanford); *Rhoseen Dhu*, a dramatic monologue; and *The Postbag, a Lesson in Irish*, an operetta (1901).

GRAVES, RICHARD (1715-1804). An English novelist, born in Gloucestershire. He graduated at Pembroke College, Oxford, in 1736, was elected a fellow of All Souls, and studied medicine in London. In 1749 he became rector of Claverton, near Bath, where he remained till his death. Of his verses and numerous sketches and novels, only one has survived, *The Spiritual Quixote* (1772), an amusing burlesque.

GRAVES, ROBERT JAMES (1797-1853). An Irish physician famous as a clinician, lecturer, and original investigator. His name, with that of Basedow (q.v.), is known to modern students of medicine in connection with exophthalmic goitre; but it was his work in the treatment of fevers, especially typhus, which was most important. He came of a Dublin family of divines and scholars, and studied medicine at Trinity College. After a brilliant university career, Graves pursued his medical studies in London, Berlin, Göttingen, Hamburg, and Copenhagen. Returning to Dublin in 1824, he established, with some others, the private medical school known as the Park Street School. At this time clinical or bedside teaching was practically unknown, students getting their knowledge from formal lectures and private study, and to Graves is due the credit of thoroughly incorporating the clinical method into elementary medical education. As early as 1819 he began his experiences with typhus fever, when he was sent by the Government to take charge of an extensive district in the west of Ireland where the fever was raging. In the successive epidemics which visited the country from 1819 to 1848 he was actively engaged. He recognized the contagiousness of typhus and introduced a tonic and supportive treatment in place of the starvation and purging method which then obtained. His efforts had much to do with stamping out the disease in Ireland. In 1827 he was elected professor of the institutes of medicine to the King and Queen's College of Physicians. His contributions to scientific literature were many. He was one of the editors of the *Dublin Hospital Reports*, was associated with Sir Robert Kane in the editorship of the *Dublin Journal of Medical Science*, and wrote much for the *Transactions of the Royal Irish Academy* and the *Edinburgh Philosophical Journal*. His book *Clinical Lectures on the Practice of Medicine* (1843) was used in every medical school in Europe.

GRAVES, THOMAS, Lord GRAVES (c.1725-1802). An English naval officer. He was present as a lieutenant at the action off Toulon (1744), and in 1755 was placed in command of the frigate *Sheerness*. By 1779 he had attained the rank of rear-admiral, and in 1780 was sent with six ships of the line to North America to reënforce Arbuthnot. He succeeded to the chief command of the British fleet in American waters in 1781, and from September 5th to 10th encountered the French West Indian squadron under De Grasse in an indecisive contest at the mouth of the Chesapeake. On October 19th, with 25 sail of the line and two ships of 50 guns, he left New York for the relief of Cornwallis. On the same day Cornwallis surrendered, and Graves, upon his arrival on the 24th, found himself unable to accomplish anything. He thereupon relinquished the command to Rear-Admiral Robert Digby, and went to Jamaica in the *London*. In 1782 he was ordered to the command of a squadron of nine vessels destined for England, and largely consisting of the prizes obtained by Rodney in the battle with De Grasse off Dominica (April 12, 1782). Only two of the unseaworthy craft got to England. Graves became vice-admiral in 1787, and admiral in 1794. During the war with France in 1793-1802, he distinguished himself in Lord Howe's naval victory of June 1, 1794.

GRAVESANDE, grä've-sän'de, WILLEM JAKOB, or STORM VAN 'SGRAVESANDE (1688-1742). A Dutch mathematician and philosopher, born at Hertogenbosch. He was made a member of the Dutch Embassy in London, where he was influenced by Newton and other scientists. He was

appointed professor at the University of Leyden, and in that capacity had much influence upon the development of natural science. He invented the first heliostat, and was one of the first scientists to accept Newton's theory of gravitation. His principal productions include: *Physices Elementa Mathematica Experimentis Confirmata sive Introductio ad Philosophiam Newtonianam* (3d ed. 1742) and *Philosophiæ Newtonianæ Institutiones* (2d ed. 1744).

GRAVES'S DISEASE. See BASEDOW'S DISEASE.

GRAVESEND, grāvz'ĕnd. A market-town, municipal borough, and river port in Kent, England, 30 miles below London, on the right bank of the Thames (Map: England, G 5). Its prosperity has always depended upon London, of which it is the boundary port, where pilots and revenue officers board vessels ascending the river, and where troops and passengers embark for long voyages. Its extensive fruit and vegetable gardens form the chief supply of the London markets; it carries on an important trade in fish and in ships' supplies, has boat-building, iron-founding, brewing, and soap-boiling. The town occupies a commanding position on the first rising ground after entering the river, and extends for two miles along the water-front, the older and lower portion with narrow streets and the upper and newer portion with handsome thoroughfares, squares, and terraces. Its salubrious air and beautiful scenery make it a favorite excursion and summer resort. Its public buildings are conspicuous, and include the late Decorated Milton parish church of the time of Edward II., and the Gravesend parish church, reërected in 1731, which was the burial-place of the celebrated Indian princess Pocahontas in 1616. Among the educational establishments are the free grammar school (founded 1580), Parrock Hall Industrial School, Milton Mount Congregational School for Ministers' Daughters, science and art schools, and a free library.

The *Domesday Book* mentions Gravesend as a hythe or landing-place. A town soon grew up after the Conquest, and the hythe was the assembling-place for early navigators, including Sebastian Cabot and Martin Frobisher. Here the London Lord Mayor, aldermen, and city companies received all eminent foreigners and conducted them up the river in stately procession. The privileges granted by Richard II. and Henry IV. were confirmed by Queen Elizabeth's charter of incorporation in 1573. The fortified Vaubanian earthworks, constructed in the reign of Charles II. to reënforce Tilbury Fort, have been strengthened in recent years at considerable expense. The municipal borough comprises the parishes of Gravesend and Milton. Population, in 1891, 24,000; in 1901, 27,200.

GRAVIER, grà'vyà', JACQUES (?-1708). A French missionary in Canada and Illinois. He continued the work of Marquette among the Indians for several years, but was constantly opposed by the medicine men. He was very successful, however, among the Kaskaskia Indians, many of whom he baptized. Dangerously wounded by a hostile native, he sailed for Europe in 1706, returned in 1708, only partially cured, and died at Mobile soon after. He wrote three works on the Indian missions and Louisiana affairs, and compiled a grammar of the Illinois tongue.

GRAVINA IN PUGLIA, grà-vē'nà ēn pōō'-lyà. A city on the Gravina, in the Province of Bari delle Puglie, Italy, 89 miles southeast of Foggia (Map: Italy, L 7)). It has a collegiate church, an episcopal library, a hospital, and several asylums. It markets grain, vegetables, wool, cheese, wine, horses, mules, oxen, and sheep. The annual fair in April is important. It was a favorite hunting-place of Emperor Frederick II., who built the castle. Population of commune, in 1881, 16,905; in 1901, 18,685.

GRAVING DOCKS. See DOCKS.

GRAVITATION (Fr. *gravitation*, from Fr. *graviter*, to gravitate, from Lat. *gravitas*, weight, from *gravis*, heavy). The idea that there is an action between the earth and its moon and the sun and its planets perfectly analogous to that between the earth and a falling body occurred to many astronomers and students of science previous to the announcement by Newton in 1687 of his famous law of universal gravitation; but it was reserved for Newton to give this law exact mathematical expression. All bodies, when raised into the air and left unsupported, fall to the earth. The force which causes them to do so is termed gravity, and, universal experience shows, acts toward the earth's centre; more strictly, it acts in a direction perpendicular to the surface of still water. But if a body, such as a stone, be projected obliquely into the air, it describes a curved path, and when it meets the earth in its descent, its direction is not toward the centre, but inclined to it at the angle of projection. (See PROJECTILES.) Observing this, and that the body, if not stopped by the earth's surface, would continue to move in a curve, it is easy to imagine that it might circulate round the earth's centre as the moon does round the earth. (See CENTRAL FORCES.) Observing now the time of revolution of the moon, we can calculate the force with which it tends to leave the path (centrifugal force). This must be balanced by an equal attractive force, or we should lose the moon. But then the question arises, Is this attractive force the same as the force acting on bodies near the surface of the earth? The answer is that it is a force 3600 times less energetic. If, then, gravity be the force which really holds the moon to its path, we must explain why it acts upon it so much more feebly than it would were it a body on the earth's surface. The explanation is given at once if we suppose gravity to be a force whose magnitude diminishes with increase of distance, and inversely as the squares of the distances at which it is exerted; for the distance of the moon from the earth's centre is about 60 times that of the earth's surface from its centre, and $3600 : 1 :: 60^2 : 1$. We infer that this explanation is correct from the fact that there is nothing inadmissible in such a diminution of force with increase of distance, and in the argument drawn from the necessity of otherwise supposing some other force than gravity to be employed in deflecting the moon, and the force of gravity to cease at some unknown level. On these views Newton is understood to have at first rested his law of universal gravitation. Every particle of matter in the universe attracts every other particle with a force directly proportional to the mass of the attracting particle, and inversely to the square of the distance between them. Newton, before conceiving the law, had explained the

three great Keplerian laws of motion obtaining in the solar system by reference to an attractive force residing in the sun. These laws are: (1) That the planets revolve round the sun in ellipses, having the sun for a common focus. (2) That every planet moves in such a way that the line drawn from it to the sun sweeps over equal areas in equal times. (3) That the squares of the times occupied by the several planets in their revolutions in their elliptic orbits are proportional to the cubes of their mean distances from their common focus, the sun. From the law of equal areas Newton inferred that every planet is retained in its orbit by a force of attraction directed toward the centre of the sun; from the orbits being elliptical, he inferred that in each case this force varies in intensity according to the inverse square of the body's distance from the sun; while from the third law he inferred the homogeneity of the central force throughout the solar system.

It was then, after being familiar with the notion of terrestrial gravity and its action, through the researches of Galileo, Huygens, and Hooke, and with the notion of a central force acting inversely as the square of the distance through his explanations of the laws of Kepler, that he put to himself the question: Is not the force with which the moon is pulled to the earth the same with gravity? A question answered affirmatively on the supposition of gravity, like the sun's attraction, being a force diminishing with increase of distance and according to the same law. The result was to bring the whole solar system within the range of the law of gravitation. The phenomena of double stars justify the extension and the statement of the law as we have given it to universal terms. It may be observed, in conclusion, that the Keplerian laws, which may be said to have been the basis of Newton's researches, are, owing to perturbations (q.v.) caused by the mutual action of the planets, etc., only approximately correct, and that these perturbations afford, when examined, a further proof of the truth and universality of the law of gravitation.

Newton's law has been shown to hold also for smaller bodies at less distances apart. Within the range of possible experimental accuracy the law has been verified for bodies whose distances apart are as small as three or four centimeters. Whether the same law holds for bodies as small as molecules, and at distances as small as molecular distances, or not, cannot be said. Stated mathematically, Newton's law is that the gravitation force between two particles of masses m_1 and m_2, separated by a distance r, is given by the formula

$$F = \frac{G\, m_1\, m_2}{r^2},$$

where G is a constant expressing the fact that F is proportional to $\frac{m_1\, m_2}{2}$ and is called the 'gravitative constant.' The actual mechanical force between two bodies of known masses at a known distance apart has been measured by different observers, first by Cavendish in 1798. Thus G may be determined. It has been shown by Mackenzie and Poynting to be the same for crystalline as for isotropic bodies; and, so far as is known, it is independent of the intervening medium and a true constant of nature. In the C. G. S. system its value, as determined by Boys, is 0·000000066576, or 6.6576×10^{-8}. The same law may be applied to a body falling toward the earth; viz.

$$F = G\frac{m_1\, m_2}{r^2}$$

In this case, if m is the mass of the falling body, $F = mg$, where g is the acceleration of such a body, and nearly equals 980 on the C. G. S. system. It was shown by Newton, and later by Bessel, that the value of g is independent of the kind of matter which is falling, and it has been proved to be independent of the mass. g varies of course from point to point on the earth's surface, owing both to its rotation and to its spheroidal shape. Formulas have been calculated for g as a function of the geographical latitude Φ; one of the best is $g = 97.989\ (1 + 0.0052 \sin^2 \Phi)$. In the formula m_2 is the mass of the earth, and r is the radius of the earth if it is assumed that the gravitation action of the earth is the same as if it were all concentrated at the centre. (A homogeneous sphere, or one made up of homogeneous spherical shells, would have this action.) Therefore

$$m_1\, g = G\frac{m_1\, m_2}{r^2}$$

or

$$m_2 = \frac{g\, r^2}{G}$$

If this G is the same as in the previous formula —an *assumption* for or against which there is no evidence—the three quantities on the right-hand side of the equation are known; and so m_2, the mass of the earth, may be determined. The average density of the earth, then, is this mass divided by the volume of the earth, which is approximately $\frac{4}{3}\pi r^3$. That is, calling Δ this density,

$$\Delta = \frac{3g}{4\pi r G}$$

Assuming the above value for G; viz. $G = 6.6576 \times 10^{-8}$, this gives

$$\Delta = 5.5270.$$

For full details as to the law of gravitation, its history and its verification, reference should be made to *The Laws of Gravitation*, in "Scientific Memoir Series," edited by Mackenzie, vol. ix. (New York, 1900).

GRÄVIUS, grâ'vê-ōōs (originally GRÄVE, or GREFFE), JOHANN GEORG (1632-1703). A distinguished German philologist, born at Naumburg on the Saale, January 29, 1632. He studied law at the University of Leipzig, but while on a visit to Holland was led to abandon jurisprudence for philology. He spent two years at Deventer studying under Gronovius. In 1656 he was called to the University of Dusburg, and two years later was summoned to Deventer at the instance of his former teacher. In 1661 he became professor of history at Utrecht. There he built up a great reputation, and received flattering offers from the universities of Amsterdam, Heidelberg, Leyden, and Padua, all of which he declined. Pupils crowded to his lectures, not only from all Holland, but from all Europe. In Germany particularly almost all the great noblemen sent their sons to be educated by him. He died at Utrecht, January 11, 1703. During his life as a teacher

he edited the chief classical authors, especially the Latin ones, and also compiled two monumental works: *Thesaurus Antiquitatum Romanarum* (12 vols., Utrecht, 1694-99), and *Thesaurus Antiquitatum et Historiarum Italiæ* (12 vols., Leyden, 1704-23), completed by his pupil and biographer Burmann. Consult Burmann, *Oratio Funebris* (Utrecht, 1703), which also contains a complete list of the works of Grävius.

GRAY, Asa (1810-88). A celebrated American botanist. He was born at Paris, N. Y. In 1831 he obtained the degree of M.D., but soon relinquished the practice of medicine to become assistant to Torrey in the New York College of Physicians and Surgeons. Owing to a long delay in the starting of the United States exploring expedition, of which Gray had been appointed botanist in 1834, he resigned this post in 1837. He became, in 1842, Fisher professor of natural history in Harvard University, a chair he filled until 1873, when he withdrew from active service to devote his remaining years to the study and care of his herbarium. From 1836, when he published his first work, *Elements of Botany*, afterwards enlarged, and in 1887 renamed the *Botanical Text-Book*, he was adding to the writings that from the beginning were considered authoritative in their respective lines—taxonomy and morphology. In the schools he is perhaps best known through his *Lessons in Botany*, which first appeared in 1857 and passed through many editions. *How Plants Grow* (1858) and *How Plants Behave* (1872) are admirable for awakening the interest of the young in the actualities of plant life.

Gray's taxonomic and descriptive work upon North American plants is important and extensive. This work, coupled with his reviews of the floras of Japan and many of the Pacific islands, led him to the following important conclusions with respect to the distribution of species: Species have one origin; their distribution over the globe is due to physical causes; the flora of the north temperate zone is circumpolar; conclusions which, based on convincing data, place him in the front rank with the constructive philosophers of his day. He was one of the first American naturalists to espouse the cause of evolution. He maintained in *Darwinia* (New York, 1876) and *A Free Examination of Darwin's Treatise on the Origin of Species, and Its American Reviewers* (Cambridge, 1861), that the theory of natural selection may be reconciled with the strictest creed; but contended, in opposition to Darwin, that 'variation' is guided by an intelligent power. From 1863 to 1873 he was president of the American Academy of Arts and Sciences, in 1872 president of the American Association for the Advancement of Science. He was a corresponding or honorary member of many European scientific societies. As a reviewer, biographer, and contributor he was highly esteemed. To the *American Journal of Science* he was a constant editorial adviser.

His philosophical papers have been collected and published in two volumes by Sargent, under the title *Scientific Papers of Asa Gray* (Boston, 1888). His other most widely known works are: *Manual of Botany of the Northern United States*, sixth edition by Watson (New York, 1889); *Field, Forest, and Garden Botany*, revised by Bailey (New York, 1895); *Synoptical Flora of North America*, begun as joint author with Torrey in 1838, and continued by his successors; *Natural Science and Religion* (1880). Consult his *Letters* edited by his wife (London, 1893).

GRAY, David (1838-61). A Scotch poet, born at Merkland, Kirkintilloch, Dumbartonshire. He had been educated for the ministry, but early became a contributor to the *Glasgow Citizen*, and the success of these beginnings made him decide to devote himself to literature. In 1860 he went to London, where he was kindly helped by Monckton Milnes, afterwards Lord Houghton. But he could not get his poems printed, and the privations he suffered during those first weeks in London broke his health. He developed consumption, and died soon after his return to Scotland. Meanwhile his idyllic poem, "The Luggie," had been accepted, and was published with some other verse in 1862, Milnes himself writing the preface. During the last year of his life Gray composed a series of sonnets called *In the Shadows*. Another edition of his poems was brought out in 1874, edited by H. G. Bell. For further biographical detail, consult the sketch by his friend Robert Buchanan, in *David Gray and Other Essays* (London, 1868).

GRAY, Elisha (1835-1901). An American inventor, born at Barnesville, in Ohio. He attended Oberlin College, supporting himself by working at the trade of a carpenter. In 1867 he obtained his first patent, which was for telegraphic apparatus. Subsequently he received nearly fifty patents, relating principally to the telephone and other electrical apparatus. Claims were advanced in behalf of Gray as one of the inventors of the speaking telephone (q.v.), for which he filed specifications, February 14, 1876; but the patent was awarded to Alexander Graham Bell (q.v.), whose rights were sustained by the Supreme Court. Among his other inventions were a system of multiplex telegraphy, a type-printing telegraph, the telautograph (q.v.), and numerous telegraphic and telephonic appliances and adjuncts. He was for a number of years engaged in the manufacture of telegraphic apparatus in Chicago and Cleveland. He was the author of *Experimental Researches in Electro-Harmonic Telegraphy and Telephony* (1878), a book based upon his experiments.

GRAY, George (1840—). Statesman and jurist. He was born in New Castle, Del.; graduated at Princeton in 1859; studied law at Harvard; was admitted to the bar in 1863, and practiced first at New Castle and then at Wilmington. He was Attorney-General of Delaware from 1879 to 1885, when he was elected as a Democrat to the United States Senate to succeed Thomas F. Bayard. He was reëlected in 1887 and in 1893. In 1898 he served on the Anglo-American Joint High Commission and on the Paris Peace Commission. Senator Gray was a strong supporter of tariff and civil-service reform and of sound money. Early in 1899 he became a United States Circuit Court judge, and in November, 1900, was appointed a member of the International Committee of Arbitration.

GRAY, George Robert (1808-72). An English zoölogist, brother of J. E. Gray (q.v.), born at Chelsea. In 1831 he was appointed assistant in the zoölogical department of the British Museum. His works, which reveal much patient research, include: *Entomology of Australia* (1833);

Hand-List of the Genera and Species of Birds, containing about 11,000 species (1869-72); *Genera of Birds* (3 vols., illustrated, 1844-49), a very useful and valuable work. Gray also contributed on entomology to the works of Cuvier and Agassiz.

GRAY, Henry Peters (1819-77). An American genre, historical, and portrait painter. He was born in New York, June 23, 1819. In 1838 he studied with Daniel Huntington (q.v.), and in 1839 he visited Europe. He was elected a member of the National Academy in 1842, and during the following year executed a number of genre and historical paintings. In 1846 he revisited Europe, staying a short time, and returned again in 1871, when he spent three years in Florence. Between these two visits he was elected president of the National Academy, holding the office from 1869 to 1871. The subjects of many of his paintings are taken from antiquity, and show no particular American characteristic, but rather the influence of Italian, especially of Venetian masters. The latter portion of his life was devoted to painting portraits, of which he executed 250. He died November 12, 1877. The following list includes some of his more important works: "Immortality of the Soul;" "Greek Lovers;" "Genevieve;" "Wages and War," Metropolitan Museum, New York; "Birth of Our Flag" (1875); "Apple of Discord" (1876); portrait of "William Cullen Bryant," Historical Society, New York; "Cupid Begging His Arrow," Pennsylvania Academy, Philadelphia; "Cleopatra Dissolving the Pearl," Metropolitan Museum; "Judgment of Paris," Corcoran Gallery, Washington; "Truth;" "Ophelia;" "Normandy Girl;" "Jessica, the Pride of the Rialto;" "Blessed Are the Pure in Heart;" "Cleopatra;" "Saint Christopher;" "Hagar and the Angel;" "Portia and Bassanio."

GRAY, Horace (1828-1902). An American jurist, born in Boston, Mass. He graduated at Harvard in 1845, and at the Harvard Law School in 1849. After practicing law in Boston, he became in 1854 reporter to the Massachusetts Supreme Court, in which position he remained until 1861, compiling and publishing sixteen volumes of *Reports*. From 1864 to 1873 he was an associate justice of the same court, and was Chief Justice from 1873 to 1882. In the latter year he was appointed by President Arthur an associate justice of the Supreme Court of the United States, to succeed Justice Clifford, and served until shortly before his death.

GRAY, John Edward (1800-75). An English naturalist. He was born at Walsall, and was educated for the medical profession, and in 1821 he assisted his father in the preparation of his *Natural Arrangement of British Plants*. In 1824 he entered the British Museum as assistant in the natural history department, and in 1840 was appointed keeper of the zoölogical collections. This important post he retained till his death, and the British Museum collections are a monument of his persevering activity. The titles of his books and papers number more than five hundred. His "Catalogues" are not mere lists, but are enriched with synonyms and ample notes, whereby study of particular subjects is greatly promoted. Gray also assisted in the formation of some of the most prosperous scientific societies of London. He was a vice-president of the Zoölogical Society, assisted in the management of the British Museum, and served on the juries of the international exhibitions of 1851 and 1862.

Gray's principal works are: *Illustrations of Indian Zoölogy* (2 vols., 1832-34); *The Knowsley Menagerie* (2 vols., 1846); *Spicilegia Zoölogica* (1828-40); a *Synopsis of the Contents of the British Museum* (1866); *Genera of Birds* (1849); and *Catalogues* of various departments in the British Museum.

GRAY, John Purdue (1825-86). A distinguished American alienist, born in Pennsylvania. He graduated at Dickinson College in 1846, studied medicine, and received his medical degree from the University of Pennsylvania in 1848. He was assistant physician at the New York State Insane Asylum at Utica from 1851 to 1853; medical superintendent of the Michigan State Asylum, at Kalamazoo, from 1853 to 1854; and medical superintendent of the Utica State Asylum, New York, from 1854 to 1886. He was instrumental in securing many improvements in the treatment of the insane, and introduced the use of the microscope in study of brain-tissue at the asylums. He edited the *American Journal of Insanity* from 1854 for many years, and was prominent in many public charities, such as orphanages, hospitals, and societies for the relief of the destitute. He published several articles and addresses. Shot by a lunatic in 1882, he never recovered from the effects of the attack.

GRAY, Maxwell (pen-name of M. G. Tuttiett). An English novelist, born at Newport, Isle of Wight. She became known by *The Silence of Dean Maitland* (1886). Among her other popular novels are: *In the Heart of the Storm* (1891); *The Last Sentence* (1893); *A Costly Freak* (1893); *House of Hidden Treasure* (1898); *The World's Mercy* (1900); and *Four-Leaved Clover* (1901). In 1899 appeared *The Forest Chapel and Other Poems*.

GRAY, Robert (1757-1806). An American sailor and discoverer. He served as an officer in the American Navy during the Revolution, and at the close of the war entered the merchant marine. In 1787 he sailed from Boston as master of the sloop *Washington*, and under the command of Capt. John Kendrick, of the ship *Columbia*, bound on a trading voyage to the northwest coast and to China. Kendrick decided to remain on the coast, so Gray took command of the *Columbia*, and sailed for China with a cargo of furs. Thence he returned home by way of the Cape of Good Hope (1790), the first to carry the American flag around the globe. According to Gen. A. W. Greely, Gray actually entered the Columbia River in August, 1788, during this voyage; but however that may be, he did enter it on May 11, 1792, during a second voyage. It was largely on this discovery that the United States based its claim to the Oregon country.

GRAY, Stephen (?-1736). An English electrician. He is described as a pensioner of the Charterhouse, but biographical details are extremely meagre. His researches often went far afield, but he is credited with several interesting discoveries. He first divided substances into electrics and non-electrics, in accordance with whether they were or were not found to respond to frictional electricity. The division into conductors and non-conductors is also his, and he demonstrated that non-electrics could be made

electrics by contact with active electrics. He evolved the principles of the communication of electric power from native electrics to other bodies; discovered that electric conductivity depends on material, not on color or any similar quality, and noted the possibility of the insulation of conductors by cakes of resin. His investigations aided Charles Du Fay, and eventually led to the invention of the Leyden jar by Musschenbroek.

GRAY, Thomas (1716-71). An English poet, born in Cornhill, London, December 26, 1716. His father, Philip Gray, a money scrivener, was of a disposition so violent that his wife was obliged for a time to separate from him, and it was mainly through her exertions that the boy was educated at school and college. In 1727 he was sent to Eton, where he formed a close friendship with Horace Walpole, son of the Prime Minister. In 1734 he entered Peterhouse, Cambridge. He disliked the mathematics and philosophy of the curriculum, and left without a degree. In 1739 he went abroad, in company with Horace Walpole. They spent more than two years in France and in Italy, visiting places of interest and exploring picture galleries. The two friends quarreled, and Gray returned alone (September, 1741). Three years later the breach was healed. In the meantime Gray's father had died (1741), and his mother had settled at Stoke Poges. To please her, Gray returned to Peterhouse, where he took the degree LL.B. in 1743. Little interested in law, he settled down for six years to a severe study of Greek literature. Henceforth Cambridge was his home, though he spent two years (1759-61) in London, reading in the British Museum. In 1756 he changed his residence from Peterhouse to Pembroke. His holidays he passed with his mother at Stoke Poges, with Walpole at Strawberry Hill, and with other friends. His mother, to whom he was tenderly attached, died in 1753, and was buried at Stoke Poges. In 1757 he received the offer of the laureateship, but declined. Feeling strongly the romantic impulse, he began about 1760 to be interested in early English poetry, and then in Celtic and Norse literature. In 1768 he was appointed professor of history and modern languages at Cambridge, at a salary of £371; but he never lectured. During his later life he made several tours, the most notable being to Glamis Castle (1765) and to the English Lakes (1769). He died at Cambridge, July 30, 1771, and was buried at Stoke Poges.

Gray was a shy man, given to melancholy; he formed few but close friendships. Having inherited from his father a small fortune, he was able to devote his life to study. He has the reputation of being, after Milton, the most learned of English poets. He wrote but little; yet some of these few poems are of perfect finish. His first English poem to be published was the *Ode to Eton College* (1747), followed the next year by "Ode to Spring" and "On the Death of a Favourite Cat." "The Elegy Written in a Country Churchyard," begun in 1742, finished at Stoke Poges in 1750, was published in 1751. This poem, which has touched the popular heart, is one of the most perfect in our literature. It was followed in 1757 by the great Pindaric odes, "The Progress of Poesy" and "The Bard." In 1768 he published the first collected edition of his poems, among which were the romantic pieces, "The Fatal Sisters" and "The Descent of Odin." He also wrote good Latin verse. Consult: Gosse, *Thomas Gray*, "English Men of Letters Series" (London, 1882); Arnold's essay on Gray in Ward, *English Poets*, vol. iii. (London, 1880-83); *The Works of Thomas Gray in Prose and Verse*, edited by Gosse (ib., 1884); Tovey, *Letters of Gray*, Bohn's Library (ib., 1900).

GRAYBACK. A sportsman's name for certain sandpipers, more especially the knot (q.v.).

GRAY DUCK. A local name of the gadwall.

GRAYLING. A fish which in external appearance and habits resembles closely a small salmon, but differs sufficiently in structural character to justify its separation as of a distinct family, Thymallidæ. The only genus, including about five species, is Thymallus. They can readily be distinguished from the Salmonidæ by their more slender build, larger scales, and much larger dorsal fin, and in Europe may reach a weight of 4 or 5 pounds; but American specimens rarely exceed 1½ pounds. They are inhabitants of the streams of arctic or cold regions, and are graceful, active fishes. Their habits are much like those of the trout, but they are considered by many sportsmen superior to the trout as game fish as well as for the table.

The common European grayling (*Thymallus thymallus*) is very highly prized both for game and for food. It is found in Scandinavia, and southward to Switzerland and Hungary; what is probably the same species also inhabits Northern Russia and Siberia. It is common in the Orkney Islands, and scattered about England; but is not known in Scotland or Ireland, and is believed to have been introduced into England, where very long ago it was called 'umber.' Efforts have been made by fish-culturists to propagate the English grayling and introduce it into new streams; but they have been unsuccessful, and similar efforts with American species have also failed. These fish spawn much after the manner of trout, but in early summer instead of in the autumn, and they are more prolific.

American Graylings. Two species of grayling are known in North America. One, the arctic (*Thymallus signifer*), called 'poisson bleu' by the Canadian fur-hunters, inhabits clear streams from the Mackenzie River westward through Alaska. It is distinguished by its large size (18 inches), the great height of the dorsal fin, comparatively dull hues, and the five or six deep-blue spots on the forward part of the belly. The other species is the Michigan grayling (*Thymallus tricolor*), of which an isolated variety (*Montana*) inhabits the head-streams of the Missouri. Its existence was not known until about 1873, when it was discovered almost simultaneously in Michigan and Montana; and the sportsmen's journals of that and the following few years, especially *Forest and Stream*, of New York, contained a great deal about it. In distribution it is limited to the Au Sable and a few similar streams in northern Michigan, where it was formerly locally abundant, but is rapidly nearing extermination, by reason of the introduction there by the State authorities of brown trout (see Trout), which voraciously destroy the graylings. Ichthyologists assert that this species and its Western variety represent detached colonies left from the former or post-glacial exten-

sion of the range of the arctic grayling, of which this was once a variety. Graylings are caught by the same tackle and methods of fly-fishing as are used for brook-trout, and are in high esteem with both anglers and epicures. Consult Prith, *The Book of the Grayling* (London, 1888).

GRAY PIKE. (1) A local name of the sauger (q.v.), and (2) of the common Eastern pickerel; also 'green pike.'

GRAY'S INN. One of the four great inns of court, or guilds of lawyers, in England. The society of Gray's Inn was instituted about the beginning of the sixteenth century. It had associated with it two inns of Chancery, Barnard's Inn and Staple Inn. See INNS OF COURT.

GRAY SNAKE. A dangerous elapine snake of Australia, of the genus Diamenia. Several species are found in large numbers. The most common (*Diamenia reticulata*) is two or three feet long, uniform gray above and greenish below, with a black and a yellow circle around each eye. It frequents sandy regions, and its bite is of little account; but some of its larger congeners are deadly.

GRAY SNAPPER. A fish. See SNAPPER.

GRAY'SON, WILLIAM (?-1790). An American Revolutionary soldier, born in Prince William County, Va. He was educated in England, graduating at Oxford, and studying law at the Inner Temple, after which he returned to America, and began the practice of his profession in Dumfries, Md. He ardently espoused the cause of the Colonies, was an active worker in the pre-Revolutionary movement, and in August, 1776, was appointed an aide-de-camp on the staff of Washington. In the following year he became colonel of a Virginia regiment, which he commanded with distinction at the battle of Monmouth. He acted, at Washington's appointment, as a commissioner to treat with General Howe, concerning the exchange of prisoners, and in 1780-81 was a member of the board of war. After the fall of Yorktown he settled in Virginia and resumed the practice of law, soon winning distinction through his scholarship and oratorical powers. He was a member of the Continental Congress from 1784 to 1787. In 1788 he was a delegate to the convention called in Virginia to consider the new Federal Constitution, and with Patrick Henry led the opposition to its ratification. In 1789 he was chosen one of the Senators from Virginia in the first National Congress, but died in the following year.

GRAY'S PEAK. One of the highest peaks of the Rocky Mountains in Colorado, on the border of Summit County, 12 miles southwest of Georgetown. It is 14,341 feet high, and was named after Dr. Asa Gray, the botanist.

GRAY'S THUR'ROCK. A town in Essex, England, on the Thames, 9½ miles southeast of Romford (Map: England, G 5). It has a large trade in building materials. The *Shaftesbury* and *Exmouth*, industrial training ships of the London School Board, are anchored here. Population, in 1891, 12,400; in 1901, 14,000.

GRAY TROUT. A Southern local name for the squeteague (q.v.); also 'shad trout' and 'sun trout.'

GRAYWACKE, grā'wăk (*gray* + Ger. *Wacke*, projecting rock). A name applied to certain fragmental rocks, usually gray in color, which are cemented by an argillaceous or siliceous paste. The fragmental materials may include quartz, feldspar, slate, and other materials and rocks. The name is falling into disuse, as modern petrographers prefer to classify the varieties of graywacke with slates, sandstones, schists, etc., according to the structure and composition.

GRAY WHALE. A migratory whale (*Rhachianectes glaucus*) of the North Pacific. It is one of the rorquals (Balænopteridæ), is 35 to 40 feet long, mottled gray to blackish in color, and yields about twenty-three barrels of oil. The baleen is short, light-colored, and of little value. These whales spend the summer in Bering Sea and northward, and in the autumn return southward, where the females enter the bays of southern California to produce their young. It is during this autumnal migration that the whalemen go after them from shore stations. Formerly the animals passed close along shore in great herds; but soon after this style of fishing began, they learned to keep far out from land. 'Grayback,' 'hardhead,' and 'mussel-digger,' are other local names, the last in reference to the animal's diving, and coming up with mud on its lips. It is one of the fiercest fighters, and the hardest to kill, of all whales.

GRAZ, grätz. See GRATZ.

GRAZZINI, grä-tsē'nē, ANTONIO FRANCESCO (1503-84). An Italian poet and author, born at Florence. Little is known of his personal history except that he was an apothecary. He was one of the founders of the Accademia degli Umidi, afterwards the Accademia della Fiorentina (1540), and took the name of 'Il Lasca' (the barbel), by which he was always known. Owing to a quarrel, Grazzini was excluded from the academy. In 1550 he was the main organizer of the Accademia della Crusca, which had for its object the purifying of the Italian language. He wrote a number of comedies, such as *La gelosia* (1568), and *La spiritata* (1561), verses, usually celebrating quarrels between himself and his academic brethren, and stories in the manner of Boccaccio. The stories, part of them published as *Le Cene* (1756), are models of prose, and vivid pictures of the Florentine life of his time. A selection from Grazzini's works was made by Fanfani, under the title, *Le Cene ed altre prose* (1857), and *Commedie* (1859).

GREASE (OF. *gresse, graisse*, Fr. *graisse*, fem. of *gras*, fat, from Lat. *crassus*, thick). A term of general application to all oily or fatty matters, but generally to those having some degree of solidity, as tallow, suet, and lard. It is often applied to fatty matters which are so deteriorated with dirt or other impurities as to be unfit for manufactures which require some degree of purity in the material. Grease is largely employed as a lubricant for machinery, and especially for the wheels of carriages. The grease employed for the axles of carriages and carts consists of the most inferior kinds of grease mixed with a little tar. *Railway grease* is, in reality, a kind of soap, a small portion of soda being mingled with the materials to effect an imperfect saponification. The object is to prevent the too rapid melting of the material, which, without this precaution, would be excessively rapid, owing to the heat caused by the friction of the rapidly revolving wheels. It is also made

of very superior materials, and consists generally of the vegetable fats called cocoanut oil and palm oil; sometimes animal fat is used. This composition is placed in small metal boxes on the axles, with which they communicate by a small hole, so that, as the axle heats the surrounding parts, the grease in the boxes melts and runs through the little orifice on to the axle. (See LUBRICANTS.) The process by which grease is extracted from the fatty products of animals in the great slaughter-houses is described under DIGESTER. Grease is also reclaimed from garbage. See GARBAGE AND REFUSE DISPOSAL.

GREASE-MOTH. A pyralid moth (*Aglossa pinguinalis*), with the fore wings grayish brown, clouded with a darker hue, and covered by two indented lines. The dark-hued larva feeds on greasy clothing, etc. Another species of Aglossa damages leather-bound books.

GREASEWOOD (*Sarcobatus Maximiliana*). A plant which grows profusely in the Western United States, especially on barren and alkaline soils, from the upper Missouri River region to Mexico and west to the Sierra Nevada Mountains. It reaches a height of from 4 to 8 feet. Cattle and sheep eat its leaves and browse off the smaller stems. The plant roots deeply, and brings to the surface considerable quantities of alkali. (See ALKALI SOILS.) The name is sometimes applied in the West to species of Gutierrezia—plants which belong to the order Compositæ.

GREAT AUK. See AUK; GAREFOWL; and EXTINCT ANIMALS.

GREAT BAR'RINGTON. A town in Berkshire County, Mass., including the villages of Housatonic and Van Deusen, 26 miles southwest of Pittsfield, on the New York, New Haven and Hartford Railroad (Map: Massachusetts, A 3). It is a popular summer resort, being surrounded by remarkably picturesque scenery. It has a public library, Sedgwick Institute, and the Hopkins Memorial Manse. Many of the town records are inscribed by William Cullen Bryant, who for several years was town clerk. The manufactures include cotton spreads, towelings, and other cotton goods, paper, electrical apparatus, etc. The government is administered by annual town meetings. The town owns and operates its water-works. Population, in 1890, 4612; in 1900, 5854. Settled as early as 1725, Great Barrington formed a part of Sheffield until incorporated as a separate town in 1761. On September 12, 1786, during Shays's Rebellion, a notable riot occurred here, and near by, on January 25, 1787, a skirmish was fought between the militia and the insurgents. Consult Taylor, *History of Great Barrington* (Great Barrington, 1882).

GREAT BASIN. An area of inland drainage in the Western United States, situated between the Wasatch Mountains on the east and the Sierra Nevada and Cascade ranges on the west. It comprises most of Nevada and portions of Utah, Oregon, Idaho, and California, and has a total area of about 210,000 square miles. The basin has a gradual slope from the north, where the elevation is 4000 feet above the sea, toward the south, forming a tilted plateau whose surface is broken by interrupted groups of mountains with a general north and south trend. The Humboldt River is the only perennial stream of any size rising in the interior of the basin, but on the borders there are numerous short streams, which have their sources in the snow-fields of the Wasatch and Sierra Nevada ranges, and which act as feeders to a number of lakes, including Winnemucca, Carson, Owens, Mono, Pyramid, Sevier, Utah, and Great Salt Lake. Many of these lakes were greatly expanded during Pleistocene time. (See LAKE.) There are several large arid wastes within the basin, such as Great Salt Lake Desert, Carson Desert, and Mohave Desert, and the climate of the whole region is dry. Agriculture is confined to irrigated lands, but the mineral resources are of great importance. See GREAT SALT LAKE.

GREAT BEAR LAKE. See BEAR LAKE, GREAT.

GREAT BEND. A city and the county-seat of Barton County, Kan., 285 miles west by south of Kansas City, on the Arkansas River, and on the Missouri Pacific and the Atchison, Topeka and Santa Fé railroads (Map: Kansas, D 3). It is the seat of the Central Normal College. The city is surrounded by a farming and stock-raising region, and has flour-mills, grain-elevators, a foundry and machine-shop, etc. Population, in 1890, 2450; in 1900, 2470.

GREAT BERK'HAMPSTEAD (from AS. *birce*, birch + *hām*, home + *stede*, place). A market-town of Hertfordshire, England, situated in a deep valley, on the right bank of the small river Bulborn, on the Grand Junction Canal and the London and Northwestern Railway, 28 miles north-northwest of London (Map: England, F 5). The father of the poet Cowper was rector of Berkhampstead, and the poet himself was born here. A few massive fragments of the wall of a castle still remain, to the east of the town. A free grammar school founded in the reign of Edward III. still exists, and there is also a charity school founded in 1727. Straw-plaiting is carried on to a considerable extent, and bowls, cricket-bats, hoops, toys, and numerous articles in wood are manufactured. There are extensive chemical works, and a considerable trade in timber, malt, and coal. There is a weekly corn market. Population, in 1891, 4574; in 1901, 5219. The town is of Saxon origin, and the Kings of Mercia had a palace or castle here. William the Conqueror met the nobles and prelates at Berkhampstead, and took an oath to rule according to the ancient laws and customs of the country.

GREAT BIBLE. See BIBLE.

GREAT BRITAIN. The largest island of Europe, comprising England, Scotland, and Wales, and constituting, with the neighboring Ireland, what is officially styled 'the United Kingdom of Great Britain and Ireland.' The term 'Great Britain,' however, popularly includes the British and Irish kingdoms, and is the current designation of the British Empire. Of five adjacent island groups, the Hebrides, Orkney, and Shetland islands are included in Scotland, and the Scilly and Channel Islands in England; there are, besides, many other islands of which Man, Anglesey, and Wight are the most important. Great Britain, with an area of 88,094 square miles, is divided into England (50,867 square miles), Wales (7442 square miles), and Scotland (29,785 square miles). It lies between latitude 50° and 60° N., and is surrounded by the Atlantic Ocean or some of its divisions—the North Sea, English Channel, Saint George's

Channel, and Irish Sea. As more than four-fifths of the land surface of the earth is north of the equator, and as Great Britain is about half-way between the extreme east of Asia and the extreme west of America, it occupies the central position in the land hemisphere, which is a commercial advantage. In its far northern situation the light of the sun is continued for as many as seventeen hours a day in the summer, or growing season, which is an agricultural advantage. Its position near the European mainland gives it easy and cheap access to great foreign markets.

TOPOGRAPHY. The seas surrounding Great Britain are very shallow, rarely exceeding 300 feet in depth. The fact that the island stands on the Continental shelf has two great advantages: (1) It is protected from the cold waters of the deep Arctic currents, and thus is spared the chilling influences of the Northern Ocean. (2) The shallow surrounding waters are fitted in temperature and in abundant supplies of fish food to support myriads of the best varieties of fish, so that the fisheries constitute one of the great industries, the enormous population finding in them the only home source of food whose product is in adequate supply.

The coasts are extremely long in proportion to the area of the land. Europe, with a much longer coast-line in proportion to area than any other continent, has one mile of coast to every 200 miles of area; but Great Britain has one mile of coast to less than 20 miles of area, the shore-line, particularly on the west side, being broken up into a series of bold headlands and deep bays penetrating far into the land, so that England has a coast-line nearly 2000 miles in length, while that of Scotland is considerably longer. No part of the island is more than 70 miles from the coast. The broken character of the coasts is determined, of course, by the nature of the rocks. The headlands are formed of the harder rocks which are worn away very slowly by the sea waves and other agencies of coastal destruction. The numerous indentations and deep bays are found where the softer rocks have been worn away by the action of water and other disintegrating agencies. Two causes have contributed to increase the value of these indentations as harbors. One is the subsidence or depression of the entire western side of the island, so that the sea has been able more deeply to invade the valleys (drowned valleys); the other is the rise of the tides all around the coasts, from 6 to 30 feet (the latter height at Bristol), which converts the mouths and lower parts of many rivers into deep bays or channels. Without the tide, London could never have become a great seaport. The deep-sea lochs of the west coasts of Scotland are similar in appearance and origin to the fiords of Norway. Here, as on the western coast of England, all the softer rocks have been washed away; and on the Scottish coast there is left an outer barrier of islands and an inner wall of very hard rocks penetrated by these deep fiords. On the other hand, the east coast of Scotland, composed mainly of sandstone and clay, has been easily worn into deep estuaries at the mouths of rapid rivers like the Tay; and the east side of England, composed of soft rocks, has been worn into a low, monotonous line of shore, broken only by the estuaries of rivers whose current is too sluggish to wear away deep channels. Most of the good harbors are, therefore, along the west and south shores of the island. The south coast is picturesque, with lofty cliffs and rocky shores dotted with summer resorts.

The highlands and lowlands of Great Britain may roughly be divided into four well-defined areas: (1) The Scottish Highlands, a mountainous and comparatively barren region, lie northwest of a line drawn from Dumbarton to Aberdeen. (2) The Scottish Lowlands, an expanse of fertile lowland and the Southern Uplands, lie southeast of this line. (3) The mountains of England and Wales lie northwest of a line drawn from Exeter to Berwick. (4) The lowlands of England lie to the southeast of this line.

There are in the Scottish Highlands a number of parallel ranges of mountains, the highest mountain being Ben Nevis, 4406 feet, the culminating point of the island. The only passageways are at their extremities. At these extremities are the two roadways through Scotland from south to north, the eastern coast forming the easiest and most traveled route, its importance being increased by the fertile plains which the eastward draining streams have multiplied in Scotland on the borders of the North Sea. These plains have a large population. Plains are lacking on the Atlantic seaboard where the mountains descend to the sea. The crystalline rocks of the Highlands yield only a meagre soil, and the difficulties of production are increased by the high northern latitude, giving a raw climate and the excessive precipitation which results in very numerous peat-bogs and tarns that considerably diminish the available surface. On the other hand, the abundant alluvium of the eastern plains makes a fertile soil, and wheat is grown as far north as Moray Firth in latitude 58°. The seaboard, however, is the main source of prosperity, facing, as it does, Europe, sheltered from the west winds, and supplied with a group of fine ports. Trade and the fisheries absorb the energies of the larger part of the population of this section.

The Scottish Lowlands, which connect the Highlands with the Southern Uplands, are a plain, diversified by many hills of hard igneous rocks, covered with fertile soil, and abounding with natural advantages that have concentrated in them most of the population of Scotland. Agriculture is richly developed; the coasting trade, oceanic commerce, and the fisheries, both local and pelagic, are of first-class importance; and the great coal and iron fields of the southwest have developed enormous industries which, starting in the region around Glasgow, have spread eastward even to the Edinburgh district, making the Lowlands the most important manufacturing district in Great Britain outside of Yorkshire. The Southern Uplands, among which the Clyde rises, are a plateau where the heights are massed into different groups by the rivers that have excavated the valleys.

From the middle of England a broad peninsula (Wales) pushes out toward Ireland. The whole of Wales and the part of England lying to the northwest of the line from Exeter to Berwick are a highland. This hilly and mountainous region is composed of very old sedimentary rocks with masses of crystalline rocks at various centres. Thus the mountains have been partly weathered from the plateau surface into their present forms or were pushed up from below by terrestrial con-

vulsion. The mountains are not so high as those of Scotland. It may be said of the island as a whole that it becomes lower and flatter as it widens out toward the south. The main direction of the mountain ranges of England and Wales is from north to south or from northeast to southwest, and they thus interpose no obstacles to communication with the Scottish Lowlands except among the Cheviot Hills which, extending along the border, belong to Scotland more than to England, and helped Scotland long to maintain a separate political existence. The railroad connections between England and Scotland are still mainly around the ends of the Cheviots through Carlisle and Berwick.

The Cheviot Hills are separated from the Pennine Chain by a low strip through which there is easy railroad communication across North England between Carlisle and Newcastle. The Pennine Chain is a succession of moors and hills of Carboniferous formation, the latter from 1000 to 2900 feet high, the backbone of Northern England, extending south 150 miles, and forming the water parting between east and west flowing rivers. On both sides of the chain the coal measures come to the surface of the plain, forming the coal-fields of Lancashire and Staffordshire on the west and of Yorkshire on the east. The Cumbrian group of mountains, a region also known as the English Lake District, is in the northwest of England, and is joined to the Pennines by the high moorland of Shap Fell. This ring of peaks, rising to over 3000 feet, is in its scenic aspects the grandest and most beautiful part of England. Its deep valleys have been eroded from the original high plateau of igneous and old sedimentary rocks, and in these valleys are the long, narrow lakes that have made this district famous for its picturesque charm. The Welsh or Cambrian mountains, in which the Welsh tribes were long able to maintain an independent and separate existence, cover Wales, and are mostly of very old sedimentary strata with crystalline rocks at various points. A wide band of coal measures in the south forms the great coal-field of Wales. Unlike the Scottish Highlands, these mountains do not impart great ruggedness to the coast, because the rivers have brought down vast quantities of sediment, spreading it out into delta plains and largely filling the fiords that formerly existed. The high peninsula of Devon and Cornwall, forming the extreme southwestern extension of England, is the fifth and last feature of the highlands of South Britain. It is separated from Wales by the Bristol Channel, while another great depression on the south, the English Channel, severs it from Brittany, France, with which it is closely related in its crystalline and primary rocks, its high, unfertile moorland, and its climate.

To the southeast of this great highland region extend the fertile lowlands of England, less than 500 feet above sea-level as a rule, comparatively flat, composed of younger sedimentary (Mesozoic and Tertiary) rocks, the harder of which stand above the general level, forming several bands of higher ground, the oölitic and chalk bands being most prominent. The oölitic belt of higher ground extends to the northeast from Portland Bill in the south to Whitby in the north, forming, among the various elevations, the Cotswold Hills and the north Yorkshire moors, the latter, nearly 1500 feet in height, being the loftiest part of the plain region of England. Directly east of this Jurassic formation and extending parallel with it is the chalk country, whose ridges of hills form the Salisbury plateau, the Chiltern Hills, and other elevations. These chalk heights also extend along the south of England (the North and South Downs), and are seen in the white cliffs fronting the English Channel and abutting on the North Sea in the North and South Forelands. Between the North and South Downs, the weald, once heavily wooded, wedge-shaped, penetrates westward from the North Sea; and between the north extending chalk lands and the North Sea extends the London Basin, low, remarkably fertile, whose coast is broken by several estuaries, among which that of the Thames is most prominent. One more distinctive feature, about midway on the east coast of England, is the marshy expanse of the Fenland, lying almost at the level of the sea. This great plain of England, with its diversified formations, is preëminently the agricultural region of Great Britain.

Hydrography. The water parting is situated much nearer the west than the east coast, with the result that the larger number of rivers flow to the east; with the exception of the western Severn, the eastern rivers are the longest, and their basins larger than the western basins. As the eastern rivers of England flow sluggishly down the gentle slope of the plain lands, it is natural that they should be least liable to floods and most important for navigation. Their value for commerce is somewhat impaired, however, by the fact that, crossing the softer rocks of the plain, they carry down a great deal of alluvium with which their mouths are often seriously clogged. The Tyne, Wear, and Tees of Northeast England have a course of only 70 or 80 miles, and their commercial importance depends upon the great coal-fields (Tyne and Wear) and the iron and salt deposits (Tees) near them. The basin of the Humber embraces 10,000 square miles, from the mineral beds of the Pennine slopes through the rich agricultural plains; the Aire, Ouse, Trent, and other tributaries help to make it one of the most useful river systems in England. The Thames rises only 300 feet above the sea, but it has a long course of about 200 miles. Its sluggish current, its well-protected estuary, and the tides which carry the largest ocean vessels 50 miles up to London Bridge, help to make the Thames one of the largest commerce-carriers among the world's rivers. The important western rivers of South Britain are limited to the Severn and the Mersey. The Severn is the longest British river (nearly 250 miles), with tides of extraordinary height, and empties through one of the largest and richest coal-fields in Europe. It is navigable for a long distance, and is a great commerce-carrier. The Mersey is a short river, rising on the Pennine slopes and obstructed at its mouth by a shifting bar, but its proximity to a rich coal-field and to the great manufacturing district of England gives it immense importance in commerce. The western rivers of Scotland, excepting the Clyde, are only short, torrential, and commercially valueless streams; but the Clyde, artificially widened and deepened in its lower part at enormous expense, is the most important river in Scotland, and all the industries of the Lowlands and Southern Uplands—agricultural, mineral, and manufacturing—are represented in its

trade. With this exception, the longer and more gently flowing eastern rivers are most useful. The Tay, Spey, and Tweed are all about 100 miles, and the Dee and the Don about 80 miles long. The Tay and the Forth are great water highways, commanding all the river traffic passing through the eastern-central portion of Scotland. The two famous lake regions of Great Britain are in the Highlands of Scotland, where here and there in the valleys the rivers have spread out into long and narrow lakes or lochs, which follow the curves of the hillsides and contribute much to the beauty and charm of this picturesque region, and the Lake District of the Cumbrian Mountains in Northwest England, already mentioned.

Climate. Warm winters, cool summers, and large rainfall are the characteristics of the British climate. The island owes these advantages to the surrounding seas, which are unusually warm considering their latitude. The westerly winds (the southwest Anti-Trades) blowing most of the time from off the broad expanse of the Atlantic, heighten the temperature of the winter months, mitigate the heat of summer, and cover the skies, for a great part of the year, with clouds which often hang upon the land as fog. Icebound harbors are unknown. There is no great variety of climate, because the country is not of great extent, and its surface, even to the mountain-tops, does not reach a high elevation. The difference of summer temperature between the extreme north and south of the island is about 10°. Some distinct varieties of climate due to wind, moisture, and differences of elevation, may be mentioned. In April, May, and June the winds blow more frequently from the east than from the west. These are the drier months in Great Britain. The copious rains which the westerly winds bring make the highland regions of the west among the richest in rainfall of any part of Europe; but the larger part of the precipitation descends upon the highlands of the west, the plains of the east receiving a far smaller quantity of rain. All parts of the country, however, receive sufficient rain for agricultural needs; and the numerous valleys extending southwest and northeast permit the sea air to carry much moisture far inland before it falls as rain. The annual range of temperature is smallest in the west because it is more exposed to the influence of the Atlantic. The summers are, therefore, a little warmer and the winters a little colder on the plains than among the western mountains. The western regions also have more sunshine than the plains, where cloud and fog are more prevalent. The average temperature of Great Britain for the year is 48° F. with extremes of 53° (Scilly Islands) and 45° (Shetland), so that the mean annual temperature decreases about 1° for every 100 miles toward the north. Snow falls on the higher lands, and sometimes covers most of the country; but no mountain is so high as to be snow-capped in summer. The islands are exposed to the great cyclonic storms which sometimes sweep in from the Atlantic.

Soils. Soils formed from the immediately underlying rocks are not the most common in Great Britain, and where they are so formed they are usually poor. Thus the hard crystalline rocks of the western mountains yield a comparatively poor soil; and the soil is not very fertile south of the Thames, where the local chalk and flint enter so largely into its composition. The very fertile soils of most of the plains, particularly north of the Thames, are the mixed components of many kinds of rocks ground up by glacial ice, carried a considerable distance and spread over the surface. Thus the best wheat lands are mixed soils. The rivers, also, passing over many varieties of rocks, spread this mixed rock waste along their valleys, and these alluvial soils are very fertile. The soil of Scotland is naturally fertile outside of the mountain districts.

Flora. The native flora of Great Britain is almost identical with that of the neighboring portion of Continental Europe; some mainland species, however, do not appear. In early times the island was almost completely covered with forests, but to-day little of the original woodlands remains, and only 3.6 per cent. of the surface is covered with forests, so that the country is largely dependent upon other lands for forest products. The chief native trees are the oak and beech in the lower lands, and the Scotch pine and birch in the high and more northern districts. The great rainfall on the steeper mountain slopes has generally washed away the soil, showing the rock skeleton unrelieved by vegetation. On the gentler slopes of the Scottish and Welsh highlands, little except moss, fern, and heather can grow in the thin soil; they are the characteristic forms of vegetation in these higher regions; the valleys between the mountains, however, are often rich in grass which is turned to good account by sheep and cattle farmers. All the cultivated plants that thrive in the lower lands have been introduced from the neighboring Continent and America. The mild, moist climate gives a peculiarly rich and fresh aspect to the vegetation. The pastures and hay lands are luxuriant, and the fields look like well-kept gardens.

Fauna. As the British Isles, until geologically recent times, were an integral part of the Continent, they partake of the general fauna of Western Europe, and present few differences except such as are due to man. All the larger animals were long ago exterminated (see Extinct Animals), or have been preserved only as curiosities on private estates, with the exception of the red deer. Otters, badgers, polecats, and weasels survive free persecution; foxes persist under protection. The hare, squirrel, hedgehog, vole, some wild mice, moles, shrews, and bats nearly complete the list of remaining British land mammals. Seals of two or three species are found on the northern coasts, and the cetaceans of the North Atlantic visit the shores from time to time. Certain common animals of Northern and Western Europe, such as the reindeer, elk, roe-deer, lemming, hamster, etc., have had no place in Great Britain within historic times; neither have several mammals of Southern France.

The birds more fully represent the European air fauna, for the British Isles lie upon a path of coastal migration between tropical and northern latitudes. This brings regularly to Great Britain most of the European birds, but some species are exceedingly rare there which occur commonly in the Rhône-Rhine Valley. Laws have long afforded protection to all birds, resident or migratory, preserving many species that were formerly threatened with extinction, yet some have been lost. The principal British birds are the raven, hooded and carrion crows, rook, jackdaw, magpie, chough, and jay—the last two be-

coming very scarce; the starling, the chaffinch, goldfinch, linnet, bullfinch, house-sparrow, various buntings, and other seed-eaters; the skylark and woodlark, with several related wagtails, pipits, etc.; a nuthatch and several varieties of titmouse, shrike, and waxwing. Thrushes are represented by the nightingale, blackbird, mavis, missel-thrush, and redwing—famous songsters; and lesser insect-eaters are the two chats, the wheatear, the redbreast, and several small warblers, accentors, wrens, flycatchers, etc. Several swallows are familiar about buildings and river-banks, and two or three woodpeckers. The cuckoo, nightjar, swift, and kingfisher, one species each, carry the list to the birds of prey. These include the brown, barn, and several other small owls, with the great snowy owl as a winter visitor. The osprey is rare. Among the falcons are the peregrine, kestrel, gerfalcon, merlin, and pigeon and sparrow hawks. Honey-buzzards, kites, eagles, and vultures are seen only at long intervals, when they wander over from the Continent. The buzzards, goshawk, and marsh-harrier complete a long list. Fishing birds are represented by cormorants, gannets, etc., on the coast; and by the bittern inland. Waterfowl include tame swans, the wild bernacle, greylag, bean, and pink-footed geese, and a series of ducks to a large degree identical with those of Canada. Four species of typical pigeons include the wild stock of domestic doves and the widespread turtle-dove. The game birds are the capercailzie, blackgame, red grouse (one of the few birds peculiar to the British Islands), and the introduced pheasant; but sportsmen find a long list of visiting shore-birds, most of which are known also in America; while the sea-birds are those of the North Atlantic coasts generally.

Fishes abound in the 'four seas' about Great Britain, and their capture supports a large maritime population (see *Fisheries*); certain species, as the sole, turbot, and whitebait, are local and of wide repute for excellence. Salmon still ascend the northerly rivers of the Kingdom, under legal protection, and trout, grayling, and various fresh-water fishes of interest to anglers are similarly preserved. Oysters and various other 'shellfish' abound and are largely fished for or cultivated for food. Of reptiles, Great Britain contains but four—a small viviparous lizard, a blindworm, a small colubrine snake (*Tropidonotus natrix*), and the adder (*Pelias Berus*). Several frogs, two toads, and some newts, comprise the amphibians. The insects, mollusks, and lower invertebrates are as numerous and varied as might be expected in a mild and moist climate, and have been more thoroughly studied, perhaps, than anywhere else on the globe.

Geology. The Highlands in the north and west are the remnants of very ancient crystalline and sedimentary rock masses that were greatly disturbed in early geological epochs and have since been largely reduced in height and area by erosion. These regions of ancient rocks were subjected to much faulting and folding; and interspersed among them are areas which volcanic outflows, occurring in various ages and as late as Tertiary times, covered with igneous deposits, that were also greatly disturbed by dynamical energy. These elevated lands are not marked by sharp and jagged peaks, but the mountains have been worn away into rounded outlines and among them are interspersed a number of broad, plain-like moors broken here and there by more elevated masses of harder and particularly of eruptive rocks. The Highland regions may be compared in height with our Catskill Plateau and its surmounting elevations.

In sharp contrast with these ancient crystalline, sedimentary, and eruptive masses forming the Highlands are the younger rocks of the Lowlands, the widely distributed Old Red Sandstone of Devonian formation, the chalk and sandstones and the clays of the Carboniferous era. Toward the south and east of the old elevated rock masses are the Carboniferous strata containing the coal deposits which have contributed so much to the material greatness of Great Britain. None of the younger and lower lands has been much affected by faulting and folding. These lower lands extend from the mouth of the Tee to the south of the island, widening with their south extension till they cover the larger part of England, Exeter being their western limit on the south coast. They are mostly flat, trough-shaped, or rolling surfaces of the Triassic, Jurassic, Cretaceous, and Tertiary formations. The greatest diversity of surface and the finest scenery is thus in the north and west, while the lowest and most uniform surface is in the south and east. The extreme south of England escaped glacial action, but elsewhere many of the minor features of the land were produced by the ice sheet and glaciers of the Ice Age. In scarcely any other part of the world is there so wide a range of geological strata in so limited an area as in Great Britain; only the broader aspects of the subjects are here indicated.

Minerals and Mining. Great Britain has been favored above other European countries in the possession of abundant resources of the two minerals—coal and iron—which are most essential to a varied and extensive industrial development. The industrial history of the nation and its present position and outlook are, therefore, intimately connected with the possession and exploitation of these resources, particularly coal. They have largely determined the distribution of population (see *Population*), have made possible the highly developed industrial life, and have proved the chief basis of the extraordinary wealth of the country. The production of these minerals did not attain their great significance until recent times, having been advanced to a prominent rôle during the industrial revolution of the eighteenth and nineteenth centuries. They were being produced, however, as early as the Roman period, and are supposed to have been not altogether unimportant. Following this period little was done until the coming of the Normans, when the industry revived. Collieries were first opened at Newcastle in 1238. Their proximity to the sea made the transportation of coal possible, and it was shipped to London and other English towns situated on navigable streams.

In the beginning of the seventeenth century coal was used in the smelting of iron, but the primitive methods of mining then, particularly the lack of means for pumping water out of the mines, limited its use. The inventions of Watt (c.1770), by eliminating this difficulty, revolutionized the mining industry, and greatly increased the possibility of production. The blast-furnace method of smelting iron had already been introduced, but the limited supply of coal, and the governmental prohibition of the use of wood (to prevent total destruction of the forests), im-

peded the development of this process. With the new supply of fuel, new possibilities opened up in the iron industry, and the increased use of iron in turn created a greater demand for coal. In the later years of the eighteenth century was witnessed a constant succession of improvements—to wit, in mining, in the manufacture of iron, in internal means of communication—all giving increased impetus to the production and use of coal and iron. The annual output of coal in the last years of the eighteenth century is estimated to have exceeded 10,000,000 tons. The introduction of the steamboat, about 1812, and of the steam railway, about 1830, not only created a new demand for coal and iron, but made the domestic and foreign distribution more practicable, thus enormously extending the market for those minerals and their products. The production of coal and iron has increased throughout the nineteenth century, the average annual absolute gain continuing undiminished. From the table below, showing the development of mining for the last forty years, the overwhelming importance of coal and iron will be seen.

No country has been comparable to Great Britain in the total product of mines. This is all the more remarkable since it includes virtually neither of the precious metals which in many other countries have constituted so large an item. Until recent years the annual output of other countries was almost insignificant in comparison. In 1820 Great Britain was producing two and one-half times as much coal as the rest of the civilized world, and as late as 1840 it was producing more iron ore than all other countries combined. The last half-century, however, has witnessed a decided change in the relative importance of Great Britain's mines. Other countries, notably the United States and Germany, have been developing their mined product still more rapidly during this period. The United States first excelled Great Britain in the latter part of the nineteenth century and is constantly increasing its lead. Great Britain's iron output was first surpassed by the United States in 1890, and its coal in 1899. In 1900 the production of coal in the United States was about one-fifth greater than in the United Kingdom. Germany now produces almost as much iron and about three-fifths as much coal. The output of the iron-mines is insufficient for British local needs; and increasing quantities, equaling in value that produced at home, are imported, chiefly from Spain; while coal for the whole period has been exported in increasing quantities, the amount reaching 46,098,000 tons in 1900, or twice that of 1880. Iron being much more easily imported than coal, Great Britain fares better than it would if the status of the production of the two minerals were reversed.

The above figures are for the entire United Kingdom; but since the Irish coal and iron mining is insignificant, they are materially correct for Great Britain. Over two-thirds of the entire product is mined in England, the remainder being almost equally divided between Scotland and Wales. The principal productive districts, beginning at the north, are, the Scottish Lowlands, or the neighborhood of Glasgow, the Newcastle District, the two fields on the east and west slopes of the Pennine range in southwest Yorkshire, and to the southeastward and in eastern Lancashire, the Staffordshire fields farther south, and the South Wales field occupying Glamorganshire and parts of the adjoining counties. The third of these districts produces the largest output, the yield in 1900 being: Yorkshire, 28,247,249 tons; Lancashire, 24,842,208; Derbyshire, 15,243,031; and Nottinghamshire, 8,626,177. For the same year, the Newcastle district produced as follows: Durham, 34,800,719 tons; Northumberland, 11,514,521. The yield of Scotland was: Lanarkshire, 17,174,247; other districts, 15,937,857. Wales, mainly Glamorganshire, together with Monmouthshire, produced 42,000,000 tons; while the production of Ireland was only 124,699 tons. Iron ore is obtained most abundantly in connection with the coal measures of Yorkshire and other regions. Red hematite ores are obtained in north Derbyshire and in Cumberland. The total production of pig iron from native and imported ores in 1900 was 8,959,691 long tons.

YEAR	Coal		Iron Ore		Lead Ore	
	Tons	Value	Tons	Value	Tons	Value
1860	81,000,000	$100,000,000	8,155,000	$12,334,000	90,000	$6,183,000
1870	112,000,000	138,000,000	14,606,000	24,756,000	99,000	6,001,000
1880	149,000,000	312,000,000	18,322,000	32,929,000	73,000	4,081,000
1890	188,000,000	370,000,000	14,066,000	19,639,000	46,000	2,030,000
1900	228,772,886	608,262,980	14,257,344	21,122,000	32,487	1,745,470

YEAR	Tin Ore		Copper Ore		Clays		Salt	
	Tons	Value	Tons	Value	Tons	Value	Tons	Value
1860	10,000	$3,744,000	240,000	$7,535,000	517,000	$1,105,000	1,596,000	$4,025,000
1870	15,000	5,011,000	108,000	2,189,000	1,219,000	2,250,000	1,270,000	3,437,000
1880	14,000	3,365,000	52,000	953,000	3,112,000	8,178,000	2,688,000	5,612,000
1890	15,000	3,912,000	12,000	139,000	3,362,000	4,695,000	2,182,000	5,500,000
1900	6,911	2,618,020	9,257	172,515	14,279,181	7,855,215	1,873,601	3,059,600

In 1900 759,900 people were employed in Great Britain in the mining of coal, the per-head output being 296 tons. As the depth of the mines becomes greater and the more profitable deposits approach exhaustion, greater difficulty and expense will attend the mining operations. In fact, the per-head product has already begun to decline. The Royal Commission, reporting in 1871, claimed that if the rate of consumption and the population both increased in the future as in the past, the supply would last 276 years. The recent rapid progress made by certain other countries in the same field threatens England's supremacy in those industries which have drawn so heavily on its coal resources, and it is not uncommonly thought that the past rate of increase in the annual coal output will not be sustained and that the supply will last a much longer period than the one mentioned.

In mediæval and ancient times in Great Britain, other varieties of minerals were relatively

of much greater importance than coal and iron. It is a matter of tradition that centuries before the Christian Era the Phœnician merchants visited England and traded in the products of the tin-mines of Cornwall. Whether this be true or not, it is certain that the Cornish mines have been worked from a very early period. During the early part of the Middle Ages, down to the time when the tin mines of Bohemia and Saxony were discovered, England supplied almost all the tin that was used throughout Christendom. Sir Walter Ralegh's famous report of 1603 on the state of trade and commerce mentions tin and lead as the chief minerals produced. In the Roman period the mining of lead was carried on so extensively that it was limited by law. Copper and silver were also mined. The revenue from the Devonshire tin and lead mines paid the expenses of the French wars of the fourteenth century. But these minerals were mined with difficulty, and the great modern improvements in transportation have made it more economic in many cases to import the ore, thus tending to check the home production. English clays have always been used in the making of pottery, and used extensively after the introduction of the improved methods by the Dutch and Huguenot immigrants. The combined annual output of copper, tin, salt, and other minor minerals was estimated at the beginning of the century at $5,000,000 in value; in 1840, at about $15,000,000; and at about the same figure forty years later; the total value is not materially different at present. The country's abundant supply of useful stone has always been drawn upon, and there has been a very rapid increase in its utilization in recent years. In 1900 the value of the sandstone quarried was estimated at $7,930,225; the granite at $6,193,735; the limestone at $6,501,570; and slate and slab at $7,641,680.

Fisheries. The natural resources of Great Britain include very profitable fisheries. The herring fisheries off the Norfolk coast have always been important, and were until the seventeenth century largely in the hands of the Dutch. But as the Government fostered the fishing industry, the Dutch were supplanted, and to-day Great Britain is only equaled by the United States in the value of its annual catch. The product of the catch (exclusive of salmon and shellfish) increased from £6,333,000 in 1890, to £9,215,000 in 1900. Of the latter amount, £6,610,000 was accredited to the English and Welsh coasts, £2,325,000 to the Scotch coasts, and £279,000 to the Irish coasts. The haddock fishery is the most important of the English fisheries, and the herring of the Scotch. The total product of each for the United Kingdom exceeds £2,000,000 annually. Great Yarmouth is the principal centre for the herring fisheries. The North Sea fisheries yield shellfish, mackerel, and codfish. Sardine fishing is of some importance in Cornwall and Devonshire. Oyster fisheries are widely distributed along the coasts. In 1899 24,798 boats were registered as engaged in fishing, giving employment to 109,015 men, but there was also a large number of small craft not registered. In recent years the general tendency toward centralization has been very evident in the fishing industry, and the fishing population has centred largely in a few important points, chiefly Yarmouth, Grimsby, Hull, and Peterhead. The product is mainly sent to the London fish market, which is the largest in the world.

Agriculture and Stock-Raising. Estimated upon the basis of the number of people employed, agriculture is, relative to other industries in England, less than half as important as in any of the other great nations. The country now is far from producing the amount of food it requires. This fact is generally viewed with alarm when the possible exigencies of war are considered, and makes the question of food provision of preëminent importance. Political significance attaches to the situation in that it is claimed that with Government protection, as in the Continental States (i.e. a system of import duties or of bounties), the agriculturists would reclaim soil now unprofitable, and greatly increase the degree of independence for the islands. In regard to natural facilities for agriculture, Great Britain is somewhat less fortunate than the rival nations on the Continent. Not only is its actual area much less, but a smaller proportion of it is adaptable to cultivation, and even that is, on the whole, of only moderate natural fertility. The climatic conditions, temperature, and rainfall are, however, generally favorable, though the summers are too cool for the growing of corn. It is only since the great increase in population beginning in the latter part of the eighteenth century, that the agriculture of Great Britain has failed to meet the food requirements of the people. It was formerly an exporter of food products and in its earlier history agriculture was almost its only industry. In harmony with the economic ideas then current, the Government protected the industry with almost prohibitive import duties. The repeal of the corn laws in 1846 opened the markets to the competition of the world, and British agricultural interests, though prosperous for a time, are now helping to pay the price of national prosperity.

The bringing under cultivation of the fertile virgin soils of other countries, and the constantly cheapening rates of transportation, have subjected Great Britain to an increasingly severe competition, and, as in the New England States, have forced a material modification in its agricultural methods. This is most marked in the decrease during the last half-century in the production of grain, particularly wheat, and the increase in market gardening and the pastoral industries, notably dairying. There has been a revival in the production of wheat since 1895, in which year the acreage reached the minimum of 1,417,000 acres. Coincident with this change have been the decrease in the arable and the increase in the pasture land. The American will be impressed by the striking disproportion between the staple crops in Great Britain as compared with those of his own country; for the raising of barley, oats, and root crops is necessary to take the place which corn fills in the United States. The extensive brewing interests create a demand for hops, which are grown on a large scale in Kent and Sussex, but the competition of the American product has robbed the English producer of his profits. The large population creates a demand for fruit and garden products, the production of which is consequently of great and increasing importance, particularly in the southeast, the Severn Valley, and generally in the vicinity of the large cities. The distribution of crops varies

in the different sections, being determined largely by physical conditions. The Highlands of North and South Scotland, of Western England, and of a large portion of Wales, are unavailable for tillage; in fact, a considerable portion of these hilly regions is scarcely available for grazing purposes. Again, there are extensive lowlands and swampy regions as in the Fens of Lincolnshire, which, even with extensive drainage, have not been entirely brought under cultivation. The proportion of the total area under crops and grass for England, Wales, and Scotland is seen in the following table:

CROPS	England			Wales			Scotland		
For the years	1871-75	1886-90	1901	1871-75	1886-90	1901	1871-75	1886-90	1901
Total acreage under crops and grasses	23,912,418	24,960,192	24,694,192	2,652,483	2,842,616	2,823,062	4,560,825	4,895,715	4,900,131
Permanent pasture	10,216,981	12,622,030	13,457,600	1,581,558	1,937,588	1,941,365	1,084,983	1,207,626	1,428,224
Arable land	13,695,437	12,338,162	11,236,592	1,070,925	905,028	881,697	3,475,842	3,688,089	3,471,907
Cereals and pulse: Wheat	3,284,445	2,270,916	1,617,721	119,844	70,404	47,019	122,513	59,311	36,225
Barley	1,953,388	1,790,461	1,635,426	161,650	120,668	101,907	252,105	217,789	235,115
Oats	1,418,808	1,685,769	1,831,740	245,486	249,326	208,773	1,007,339	1,033,613	956,389
Rye	46,002	52,384	49,649	1,945	1,293	1,460	10,480	8,422	5,541
Beans and peas	846,501	557,860	389,546	8,592	3,727	2,811	29,078	18,481	14,386
Total	7,549,144	6,357,390	5,524,082	537,517	445,418	361,970	1,421,515	1,337,616	1,247,656
Green crops: Potatoes	335,011	371,294	415,105	47,018	40,558	31,979	167,880	150,680	130,176
Turnips and Swedes	1,555,128	1,404,360	1,144,035	70,201	71,323	61,934	503,709	481,825	458,556
Mangold	331,249	337,139	386,044	6,931	7,324	9,811	1,748	1,255	2,950
Cabbage, etc., vetches or tares, and other green crops	586,300	507,026	456,081	9,626	5,744	6,755	20,484	24,117	25,804
Total	2,807,688	2,619,819	2,401,265	1,337,776	124,949	110,479	693,821	657,877	617,486
Clover, sainfoin, and grasses under rotation	2,684,367	2,802,726	2,862,658	366,433	318,062	400,268	1,338,106	1,655,341	1,593,461
Flax	11,856	2,440	630	124	19	6	731	303	4
Hops	64,039	60,926	51,127	3					
Small fruit	.	37,068	67,828	...	646	1,092	.....	3,916	6,079
Bare fallow	568,343	472,620	329,002	33,072	16,193	7,882	21,669	14,601	7,221

It will be seen that, in a general way, England stands out in remarkable contrast from the other two sections of Great Britain. Two almost equal agricultural divisions are recognized in England, the one extending from Northumberland and Cumberland south to Dorset and west to Cornwall, or the western half of England, being predominantly grazing, the other, or eastern half, being predominantly grain-raising. From the above tables it will be seen that wheat-growing is mainly confined to England, as are also rye, beans, and peas, and that oats and barley are strikingly prominent in the other two divisions. Potatoes and turnips are more proportionately divided between the three kingdoms. Incidentally it may be noted that Great Britain contrasts with Ireland mainly in the production of wheat, oats, and potatoes. Ireland is prominent in the production of the last two crops, but raises scarcely any wheat. (See IRELAND.) Grazing is relatively of much greater consequence in Great Britain than in the United States, or in other European countries (omitting Ireland). However, a statement of the acreage alone does not indicate the true significance of British agriculture. In that respect it scarcely exceeds some of our American States, as, for instance, Illinois or Iowa. Its real importance appears when we consider the intensiveness of cultivation, the advanced scientific principles applied, and the resultant large size of the product per acre. In these respects Great Britain is unsurpassed. By a scientific rotation of crops, a maximum cultivation of the soil, and a liberal use of natural and artificial fertilizers, the reluctant soil is made to produce extraordinarily. Thus, while the area of cultivation has for half a century remained stationary or decreased, the product has continuously increased. The following table indicates the product per acre in bushels for the leading crops as compared with the United States, France, and Russia:

ANNUAL AVERAGE FOR 1894–1900

	Wheat	Oats	Barley
United States	13.2	27.9	23.1
Russia	9.1	19.4	13.0
France	19.5	26.8	21.8
United Kingdom	31.8	41.6	34.8

The quality of the domestic animals must also be considered. Great Britain has originated many of the finest breeds of stock known. (See ENGLAND and SCOTLAND.) The purity of the breeds is zealously guarded, and the grade of stock averages much higher than in the United States. It is noteworthy, too, that Great Britain has more than half the total number of sheep in the whole of the United States. The following table shows the relative importance of the different domestic animals in the three kingdoms:

	England			Wales			Scotland		
	1871-5	1886-90	1901	1871-5	1886-90	1901	1871-5	1886-90	1901
Horses	988,715	1,094,683	1,161,914	120,789	140,757	154,624	178,652	190,180	194,893
Cattle	4,054,074	4,543,192	4,791,535	631,712	690,999	743,078	1,127,337	1,138,912	1,229,281
Sheep	18,717,511	16,264,922	15,548,057	2,911,385	2,780,703	3,427,734	7,161,122	6,882,598	7,401,409
Pigs	2,100,314	2,063,154	1,842,133	218,410	231,668	212,971	166,148	147,039	124,821

The agricultural products of the Island of Great Britain represent about one-third the annual value of those of the United States. Unofficial estimates for the whole of the United Kingdom show that it produces only one-fourth of the wheat it consumes, eight-thirteenths of the meat it uses, three-fifths of its barley, four-fifths of its oats, one-half its beans and peas, and less than one-half of the dairy products it needs. The home production of potatoes almost satisfies the amount consumed. It should be remembered that a great deal of the stuff fed to stock is also imported.

The agriculture of Great Britain is characterized by an unusual system of land-ownership and tenure—a system which is generally recognized as attaining a maximum of production at a minimum cost, but which is severely criticised for its social influences. The characteristics are, briefly: centralization of ownership, capitalistic tenants who pay money rent on long-time tenures, and a large laboring class who are on a very low economic and social plane. Each of these conditions contrasts strikingly with conditions in the United States. The large estates, which had resulted from the long-continued process of land inclosure in which the yeomanry were excluded, have remained intact through the operation of the law of primogeniture. In 1876 two-thirds of the entire landed property of England and Wales was owned by about 10,000 individuals — hence the expression 'upper tens.' In Scotland, in 1871, 42.1 per cent. of the total area was owned by only 68 persons. The status with regard to ownership in Great Britain has not materially changed in subsequent years.

The 'gentleman' who enjoys the honor and the profits of ownership may spend a 'season' on his estates; but their cultivation is in the hands of his tenants, who are generally under the supervision of his bailiff. Renting, therefore, is wellnigh universal, as will be seen from the following table, giving the actual acreage under crops and grass occupied by tenants and owners (1898):

	Tenants	Owners
England	21,162,000	3,594,000
Wales	2,514,000	312,000
Scotland	4,279,000	613,000
Great Britain	27,955,000	4,519,000

The following table shows the number of farms of various sizes in 1895, and the percentage of farm acreage that each class constitutes:

No marked tendencies in the size of holdings have developed since 1895, but there was a slight increase in the number of farms between 500 and 300 acres in area, and a slight decrease in the number of farms in the smaller and the larger sized classes.

The average size of farms is less than in the United States, but the intensiveness of cultivation necessitates a much greater outlay of capital and labor. The important feature is that the size of the farm is kept sufficiently large to make possible the application of capital, machinery, etc., at an economic advantage, and thus to insure a profit and the perpetuation of the industry. The renting system contrasts again with that of the United States in that it is generally for a long term of years, the tenancy even ofttimes descending in the same family for generations. To the tenant is thus guaranteed the benefits of his own enterprise, and he is induced to improve the land rather than exhaust it, as is so common a practice in the United States. Moreover, the Agricultural Holdings Acts of 1875, 1882, and 1900 provide a legal method for the tenant at the end of his tenancy to secure compensation for such value as still remains in improvements which he has placed upon the land. However, the competition of foreign products and reduction of prices, together with heavy taxes, unjust railway freight charges, etc., have fallen heavily upon the tenant, and the rents are tardily adjusted to meet changed conditions. As a result, the tenant class of England, as a class, are not very optimistic.

The tenant usually employs a number of hands; these receive, in addition to the use of a cottage, but a scanty wage, and seldom succeed in bettering their economic or social condition. The results of investigations made in the last years of the nineteenth century indicated that the average wage received for farm labor was about 13*s.* per week. It has been maintained that a system of peasant cultivation and proprietorship would greatly strengthen the manhood, independence, and national patriotism of the farm laborer, and reëstablish the yeoman class; indeed, a propaganda exists with this end in view. Laws passed in 1882, 1887, 1890, 1892, and 1894 provide that under certain conditions a demand in any locality for small holdings, either for rent or ownership, can be legally secured by compulsion if necessary. At the same time the sentiment against further inclosure has become so strong that the commoners are guaranteed their rights to the use of such forests and commons as yet remain uninclosed. The movement for the subdivision of the land has been partially

CLASSIFICATION OF HOLDINGS	Number of agricultural holdings in each class			Percentage of acreage			
	England	Wales	Scotland	England	Wales	Scotland	Great Britain
	No.	*No.*	*No.*	%	%	%	%
Above 1 acre, not above 5 acres	87,055	10,763	20,150	1.07	1.25	1.35	1.13
" 5 acres, " " 20 "	108,145	18,569	23,104	4.87	7.44	5.02	5.12
" 20 " " " 50 "	62,446	12,400	10,817	8.36	14.93	7.42	8.79
" 50 " " " 100 "	46,574	10,217	9,834	13.70	26.40	14.96	15.00
" 100 " " " 300 "	60,381	7,896	12,968	42.00	43.64	45.01	42.59
" 300 " " " 500 "	11,112	386	2,070	16.86	5.04	15.98	15.70
" 500 " " " 1,000 "	3,942	54	620	10.35	1.16	8.13	9.21
" 1,000 " " " "	524	3	76	2.79	0.14	2.13	2.46
Total	380,179	60,288	79,639	100.00	100.00	100.00	100.00

successful, as is indicated by the increase in the number of allotments (for rent), one acre and less in size, from 357,795 in 1888 to 579,133 in 1895. The prospects of the agricultural laborer are, therefore, becoming somewhat better.

MANUFACTURES. Great Britain is known preeminently as a manufacturing country. In no other land is either the percentage or the absolute number of the population engaged in the industry so large, and until the recent industrial development in the United States, no other nation had for more than a century approached Great Britain in the amount of manufactured products. Manufacturing had been for a much longer period one of the most vital and dominating industries of the Kingdom; but in the earlier periods of the nation's history the industry was of minor importance, and did not begin to equal that of the Dutch, the Flemish, or the French. Chief among the factors which have brought England up from industrial insignificance to so great a prominence are: (1) Its comparative freedom from the turbulence and destruction of wars; (2) its early superiority as a wool producer; (3) the favorable climate; (4) the great abundance of the coal and iron supply; (5) its success through the preëminence of shipping interests and the acquisition of territorial possessions in extending markets; and (6) the remarkable series of improved methods and labor-saving inventions which have been the product of British genius.

From a very early period Great Britain far excelled other northern European countries in the production of wool. The ruder and more primitive methods of manufacture were known, and coarse woolens were manufactured by each family as its requirements demanded, but not for the market. Most of the wool was exported to Flanders. Flanders depended for its supply almost wholly upon Great Britain, and Great Britain depended upon Flanders for the better and finer grades of manufactured woolens. The idea of retaining the product and securing its manufacture at home early occurred to the English, and as far back as 1258 a law prohibited its exportation. It remained, however, for Edward III., near the middle of the fourteenth century, to take advantage of internal troubles in Flanders and secure the migration of a considerable number of Flemish artisans to England. He thus accomplished the first great change in manufacturing processes. But the cloth had still to be sent to the Netherlands for dyeing, the madder plant from which the dyes were obtained and the processes of its preparation being almost wholly unknown elsewhere. During this period the guilds were prominent, and the industry centred mainly in the cities of east England. The woolen industry grew apace, but it was not until the Elizabethan reign that its complete supremacy was established. The wars and persecutions on the Continent, and the welcome by the English authorities, resulted at this time in a great influx of Flemings, who not only gave a great impetus to the old industry, but introduced new ones, such as silk-weaving, the manufacture of cutlery, cloak-making, and the manufacture of hats and pottery. A century later the revocation of the Edict of Nantes led to the emigration to England of a large number of French Huguenots, representing the most skilled artisans of France. They gave new vigor to British industry, especially to the manufacturing of silk, glass, and paper. During this epoch the industrial system changed, and the guild system, with the master workman and journeymen, gave way to the domestic or house industry, under which system the workmen were scattered through the country districts, and in addition to their mechanical trades, generally cultivated a small plot of land. In the latter part of this period another change was initiated which was attributable to the comparatively prosperous condition of the nation. The manufacturing industry had early spread well over the east and west of England, but not until now did it develop extensively in the long-desolated region of the north. The excess of moisture which characterizes the English climate was recognized as being decidedly advantageous in the manufacture of textiles, and this feature is especially marked in the north.

Then came the great industrial revolution beginning in the latter half of the eighteenth century, which increased the industrial lead of the nation at an unprecedented rate, and was so pregnant with social and political significance. The initiatory and fundamental factors in the revolution were the remarkable series of mechanical inventions produced during this period of English history, and which affected practically every branch of the manufacturing industry. In connection with the textile industry, the fly-shuttle was invented as early as 1733, but did not for some time come into general use. This was followed about 1770 by the almost simultaneous inventions of Hargreaves and Arkwright. The spinning jenny of Hargreaves spun fibre into a plurality of threads instead of a single one. Arkwright's water frame (so called from its being run by water) brought about the new system of spinning by rollers. A decade later Crompton combined the principles of both in one machine, known as the 'mule.' After a few years (1785) Cartwright followed with a machine—the power loom—which wove the yarn into cloth. Great improvements were made during the same period in the manufacture of iron, but the limited fuel-supply prevented the extensive development of the industry. The relief for this situation came after 1770 through the invention of James Watt, who rendered the steam-engine available as a great motive power of easy application. Coal production was thereby greatly increased (see *Minerals and Mining*), and consequently the manufacture of iron. The use of machinery, and especially its necessary installation in a single plant under the application of steam-power, led to the factory system and the almost complete overthrow of the old domestic system.

Very significant, too, were the resulting changes in the location of the weaving industry. The textile machines were at first generally propelled by water-power. The north region—Yorkshire and Lancashire—afforded superior facilities of this kind, and consequently enjoyed a remarkable increase in textile manufacturing at the expense of the old centres farther south. Similarly, the coal resources of the same region drew the iron manufacturing away from Suffolk and Norfolk when coal supplanted wood as a fuel. Birmingham, which had formerly depended upon the neighboring forests of Arden for the fuel used in its smelting industry, was fortunately near enough to the new coal-fields to place it at a great

industrial advantage, and it has remained the largest centre of the iron industry. When steam-power supplanted water power in the textile industries, the factories were no longer compelled to locate upon the streams and along water-courses. But as the coal-supply was in the same district, and the industry was otherwise favored there, as has been pointed out, it continued to develop in the north of England. The adoption of improved methods was, however, only gradually accomplished, these being applied first to manufactures of cotton, and subsequently to woolens and linens.

The value of the annual cotton product in the United Kingdom was one hundred times greater at the end of the nineteenth century than at the beginning. Before the middle of the century it had surpassed wool in importance. The value of the annual woolen product was three, and linen five, times as great at the end as at the beginning of the century. Some idea of the importance of these two products may be gathered from the figures of the increase of their exportation. (See under *Commerce.*) In 1890 there were 858,252 persons employed in the textile industries in England and Wales, 154,591 in Scotland, and 71,788 in Ireland. Lancashire is the largest centre of the cotton industry. Glasgow is another important centre. The woolen industry is largely confined to western Yorkshire. Both Ireland and Scotland exceed England in the production of linen. (For a more detailed description and localization of these and other industries, see the articles ENGLAND and SCOTLAND.) The manufacture of machines and metal ware is centred principally in Northern England, the different branches of this industry being largely localized in special districts. (See ENGLAND.) The Clyde district of Scotland leads the world in the building of ships. (See SCOTLAND.) Scotland and Ireland are noted for the manufacture of whiskies, and England has a very large brewing industry. For a comparison of British and American manufactures, see paragraph on *Manufactures*, in the article UNITED STATES.

A considerable part of the British history of the nineteenth century is the record of the adjustment of the social and political life to the modern industrial conditions. (See *History.*) It covers, for instance, such subjects as the abolition of child labor, the shortening of work hours, the improvement of sanitary conditions, the struggle over wages, the rise of trades unions, the adjustment of borough representation, the extension of suffrage. Labor has demonstrated its power and enlarged its privileges, and in many respects improved its conditions. Trade unionism, after a varied career, is stronger in all respects than ever before. These unions include the best element of the laboring classes, and their organizations are well protected by law. According to an estimate made in 1899 for Great Britain and Ireland, their membership was 1,801,518. Another means which has been advocated in Great Britain for the amelioration of the laboring classes, and which has met with much favor, is the establishment of various forms of co-operative societies. The coöperative attempts have been in the field both of production and of distribution, the latter being the more successful. In 1899 the 1802 distributive and productive co-operative societies in the United Kingdom making returns (it is estimated that there were 1946 in existence) contained a total membership of 1,677,018, or more than five times the membership for 1872. The 1134 societies reporting for England and Wales had a capital of £16,411,262, and the 295 Scotch societies had a capital of £2,514,008. The sales for the United Kingdom in 1899 amounted to £67,915,937, and 81,971 persons were directly employed by the societies. Friendly societies, which provide some sort of relief for their members, have secured an enormous following in the United Kingdom, the registered societies and their branches in 1899 being 27,783, with 11,750,130 members and funds amounting to £39,487,619.

TRANSPORTATION AND COMMUNICATION. Prior to the industrial revolution in Great Britain (see heading *Manufactures*), the inland transportation facilities were much inferior to those of other European countries. As early as 1423 the English Government began the improvement of the Thames River for purposes of navigation, and also the improvement of natural water-courses. The construction of artificial waterways followed from time to time. The latter part of the eighteenth century and the early part of the nineteenth century formed a period of remarkable development in canal construction, many parts of the country being covered with a network of canals, which played a leading rôle in that early period of industrial development. With the advent of railroads, the canals were superseded in a measure, and many of them now belong to the railroad companies. However, the ship canals in particular are of great importance, the largest and most famous of which, the Manchester Ship Canal, was only completed in its present form in 1894. This canal is 35½ miles in length, and has a minimum depth of 26 feet and a minimum width at the bottom of 120 feet, so that large ocean vessels are able to pass at any point. The Gloucester and Berkeley and the Exeter canals are also ship canals of some importance; and the Thames, Severn, Aire, and Weaver rivers are canalized. Bearing this and the insularity of Great Britain in mind, its inland shipping facilities are remarkable. There are 142 miles of canals in Scotland and 2061 miles in England, and, in addition, in the latter country 693 miles of riverway have been improved for purposes of transportation by the erection of locks along their courses. Another method of meeting the demands of a growing industry upon transportation was the construction of toll turnpikes. At the opening of the nineteenth century Telford and MacAdam introduced their improved methods of road-making, the main point of difference in the two systems being that Telford's system required a firm stone foundation under the less substantial surface, while MacAdam considered a broken-stone surface sufficient. From this time on, British roads have been of a high order of excellence. The care of all highways is in the hands of the rural district councils, and toll is no longer collected on any of the roads of Great Britain. Tramways have from the beginning of the eighteenth century been used at the mines, and in the first years of the nineteenth century one was constructed from Wandsworth to Croyden and Reigate, and shorter ones were completed in other parts of the country.

Finally, in 1825 a railway line that was ope-

rated by steam, 14 miles in length, was opened for passenger traffic from Stockton to Darlington. Steam, however, had previously been used in the hauling of coal at the mines. The first important railway line in the world, that from Liverpool to Manchester, was opened in 1830. George Stephenson had charge of the construction on both these roads. The success of the new system of transportation being demonstrated, in a few years it spread into every part of England. The traffic at once was extensive, and almost all the lines were originally laid with two or more tracks. Though differing at first in gauge, a universal gauge (1.435 meters) has been established. The mileage for the United Kingdom in 1850 was 6620; in 1870, 15,540; and in 1900, 21,855 miles. Of the last amount, 15,187 miles were in England and Wales, and 3485 in Scotland. London is the great focal point for all the principal lines. The increase in the number of passengers conveyed is indicated in the following table:

YEAR	England and Wales	Scotland	Ireland
1862	152,437,000	17,610,000	10,436,000
1880	540,669,000	45,956,000	17,259,000
1890	721,114,000	75,215,000	21,413,000
1900	992,425,000	122,201,000	27,649,000

The enormous increase was largely confined to third-class passengers, which, for the United Kingdom, amounted in 1900 to 1,038,873,000. Since 1880 there has been an actual decrease in the number of first-class passengers, and only a small increase in the number of second-class passengers. Between 1880 and 1900 the freight tonnage for the United Kingdom increased over 80 per cent., the larger part of the increase being made in the last decade of that period. The combined capital of all the railways greatly exceeds the national debt in amount. There are many small lines, but these are nearly all operated by one of the eleven large companies which control almost the entire mileage of Great Britain. Of these, the Great Western has the greatest mileage; the largest tonnage of goods is booked by the North Eastern; and the largest number of passengers is carried by the Great Eastern. Parliament recognizes "nothing in the nature of a vested interest as attaching to railways," and privileges granted may be withdrawn when they cease to be consistent with the general advantage. No official step has been taken toward Government ownership. A railway commission of three members has final decision in questions of fact that arise in the administration of the railways. Their decisions on questions of law are subject to appeal.

Curiously enough, the tramways, which, as we have seen, antedate the railway, went into disuse when the railways developed, and it was only about 1870 that they were successfully reinstated in the form of street railways, on the model of the American system. They have not yet become nearly so common as in the United States, carriage transportation still being mainly depended upon in the cities. In 1900 the mileage of tramways in England and Wales was 933; in Scotland, 107; and in Ireland, 137 miles, about half of the above total mileage belonging to local authorities. The necessity for some means of rapid transit to meet the needs of agricultural and other interests not served by the regular system of railway transportation resulted in the construction of light railways during the last years of the nineteenth century. In 1900 seventy-one applications for permits to construct such lines were approved by the Board of Trade. The greater part of these lines were modeled after the ordinary railway, while the remainder were nearer to the type of the American interurban street railways.

Great Britain has highly efficient postal and telegraph services, both of which are in the hands of the Government. The postal system was revolutionized by legislative acts of 1837 and 1839, the penny postage for letters being established in the latter year. Following this change, the annual number of letters carried per head of the population for the United Kingdom increased from 4 in 1839 to 8 in 1840, 31 in 1870, and 57 in 1901. For England and Wales in the last year the figure per head was 62, for Scotland 47, and for Ireland 32. The revenue from the postal service exceeds the expenditure by nearly £4,000,000 annually. A parcel post, run in connection with the post-office system, has largely supplanted private express companies in the carrying of light packages. Postal savings banks and a system of life insurance are connected with the postal system. (See heading *Savings Banks.*) During the years from 1868 to 1870 the Government assumed the ownership and control of all telegraph lines in the United Kingdom, and made them a part of the post-office system. The charges were greatly reduced, with a consequent enormous increase in the number of messages sent. Telegrams may be sent to any part of the United Kingdom for 6*d.* for the first twelve words, and 1 halfpenny for each additional word. The telegraph service creates a slight deficit each year.

The Government has also developed the policy of purchasing and controlling as a part of the post-office system the telephone lines of the country. In 1892 Parliament made the first appropriation for the purchase of the lines, and by 1897 all the main lines had been acquired; but a private company still had a monopoly of the local or town lines. In 1899 the Government began to compete with the lines inside the towns, and licenses are now required of new companies specifying that the Government may purchase the line at the expiration of the license, thus preparing the way for the nationalization of all telephone lines in the near future. Great Britain is connected with Ireland by a large number of submarine cables, and thence by five lines with America. The cables to the Continent of Europe include one each to Norway, Denmark, and The Hague, and two each to Germany and France.

COMMERCE. The industrial supremacy which Great Britain has so long enjoyed has probably been more manifest in its commercial aspect than in any other. No interests excite greater solicitude on the part of British statesmen, or exercise a greater influence on the policy of the country, than the commercial. In the words of Mr. Chamberlain, "commerce is the greatest of all political interests," and the first aim of the Government should be to "increase our trade and to settle it on a firm foundation." The protection and expansion of trade are the hopes of the English manufacturer, and are the secret of England's policy of colonial expansion and zeal in main-

taining a naval supremacy. In acquiring and maintaining this position, Great Britain has perhaps more natural conditions in its favor than any other country. Situated off the west coast of Europe, it naturally became a convenient trade centre, and, because of its insularity, it was granted from the first a freedom from disturbing international conflicts that was unknown to the Continental trade centres. The importance of this strategic central position increased with the growing commercial importance of the Western Hemisphere. Again, Great Britain has been favored by the characteristics of her coast-line, already mentioned under *Topography*. To these natural advantages are added other more or less potent influences, such as her abundant natural resources, the energy, ingenuity, and perseverance of her people, her democratic institutions, and the activity of the Government in fostering and protecting trade interests.

The supremacy of English commerce is, however, of comparatively recent times. Until the reign of Queen Elizabeth the trade of the country had been almost wholly in the hands of foreigners. The fostering of English commerce and shipping was one of the expedients devised to help in the acquisition of a large treasure of precious metals; for, according to the mercantilists of that era, increase in trade would result in the natural inflow of metals. The organization of trading companies was encouraged by the granting of monopolies. The Levant Company and the East India Company extended their operations into the East, while the Virginia Company, Bermuda Company, Hudson's Bay Company, and a number of others turned to the newly discovered lands of the West, and were influential factors in the establishment of colonies. Thus began the transformation of a small European country into a vast world empire. Though at this stage competition both in the East and West was very great, England succeeded in extending its trade, the total for imports and exports increasing from £4,628,000 in 1613 to £12,428,000 in 1699. Out of the trade rivalry grew the Navigation Laws of Cromwell and subsequent acts, which tended to limit colonial trade to English or colonial vessels, and greatly restricted colonial manufactures, with a view to fostering British trade and shipping interests, and extending the market for British goods. The policy operated with great severity against both Scotch and Irish trade and industries. The union of Scotland with England in 1707, and the establishment of free trade between the two, greatly benefited British commerce. Through the wars of the eighteenth century Great Britain extended its colonial territory, and thereby broadened its markets. And when in the latter part of that century the inventions of British genius so greatly increased English productive power, its commerce grew at an unprecedented rate. From 1782 to 1792 the trade increased in value from £23,300,000 to £44,500,000, and by 1810 it had reached a value of £87,741,000. In 1780 the East Indian trade formed but one thirty-second part of the total foreign trade; but after the abolition of the monopoly feature of the rights of the East India Company as applied to India, in 1813, and later in China, this commerce rapidly increased.

British energy and enterprise had now given the country a firm hold in a wide field; but, as the chances against its maintaining its own with free competition increased, it was realized that the old trade restrictions of the navigation laws hampered rather than stimulated traffic. Accordingly, commercial treaties tending toward free trade were concluded with various powers, and finally (1846) an out-and-out free-trade policy was adopted. (For a discussion of present tariff duties, see *Finance*.) The protective laws of other countries now militate in a degree against England's commercial interests, and even the colonies, after being granted home rule, have passed protective tariffs which have not been to the best commercial advantage of the mother country, although in the case of Canada Great Britain has been favored to some extent by preferential tariffs. Nevertheless, in the commerce with its colonies and dependencies, Great Britain always has had, and still has, the lion's share. Some idea of its value to the mother country is indicated by the fact that British exports to them are now worth annually about twice the total of British exports for 1840. In 1897, 34.8 per cent. of the total imports of the colonies came from Great Britain, while for the rest of the world the British imports amounted to only 13.04 per cent. British imports from British possessions for the years 1855-59 averaged 23.5 per cent. of the total, while the average for the years 1895-98 was 22 per cent. The British exports to British possessions averaged for the same periods 31.5 and 29.3 per cent. respectively. From 1870 to 1900 the value of colonial imports from the United Kingdom increased from $269,561,917 to $496,500,059, and the imports to the United Kingdom from the colonies increased from $315,506,938 to $533,030,835. During the period 1892-96 the average annual per cent. of the total exports from the possessions into the United Kingdom was 49. For the self-governing colonies the per cent. was 70.3. The proportion of the imports from the colonies to the total imports was almost the same in 1870 as in 1900, while the proportion of the colonial imports from the United Kingdom to the total imports was much greater in the latter year than in the former. The development of British commerce for the last four decades of the nineteenth century is indicated in the following table:

YEAR	Imports			Exports			
	Total value	Per head	Total value British produce	Per head		Foreign and colonial	Total value British and foreign and colonial products
	£	£ s	£	£	s.	£	£
1862	225,716,000	7 14	123,992,000	4	5	42,175,000	166,168,000
1880	411,229,000	11 18	223,060,000	6	9	63,354,000	286,414,000
1895 .	416,689,000	10 13	226,128,000	5	15	59,704,000	285,832,000
1900 ...	523,075,000	12 15	291,191,000	7	2	63,181,000	354,373,000

From this it will be seen that the imports are increasing faster than the exports. Great Britain's imports are about twice those of any other country, and the United States alone is a close rival in value of exports. The per capita exports of the United Kingdom are about twice those of France, Germany, or the United States; but it must be remembered that the last two countries are growing in population more rapidly, and the absolute values of their exports are gaining on those of Great Britain. From a Government investigation it was found that, during the period 1884 to 1895, though the value of the products of the United Kingdom imported into other countries increased enormously, yet their relative importance diminished in every instance, as will be seen from the following table:

COUNTRIES	Proportion of imports from the United Kingdom		Total imports from all countries	
	Average of 1884–85	Average of 1893–95	Average of 1884–85	Average of 1893–95
	%	%	£	£
European countries, excluding Austria-Hungary	18	16	701,000,000	777,000,000
Egypt	39	34	9,000,000	9,000,000
United States, Argentina, Uruguay, Chile	26	24	164,000,000	196,000,000
China	25	18	22,000,000	29,000,000
Japan	45	33	6,000,000	13,000,000
British possessions	54	52	194,000,000	216,000,000

The following table shows the relative importance and the tendencies in the trade of the United Kingdom and the United States with other countries. The point of greatest significance revealed is the relative gain to the United States and the loss to the United Kingdom in the trade with European countries:

COUNTRIES	Imports from United Kingdom, average of 1884–85	Imports from United States, average of 1884–85	Imports from United Kingdom, average of 1893–95	Imports from United States, average of 1893–95
	%	%	%	%
European countries, excluding United Kingdom and Austria-Hungary	18	6	16	9
Egypt	39	1	34	0.5
American countries, viz.: Argentina, Uruguay, and Chile	35	8	39	8
China	25	3	18	4
Japan	45	9	33	8
British possessions	54	8.6	52	8.5

Prior to the reign of Elizabeth, wool constituted the bulk of English exports, while manufactures of wool and other manufactured products constituted most of the imports. But the great increase in the manufacture of wool at home soon made England a shipper of the manufactured product, and this instead of the raw wool became the leading export. With the great development in sheep-raising in the British colonies, wool came to be extensively imported, and the manufactures and exports greatly increased. The exports of woolen and worsted manufactures, however, reached their maximum (£21,300,000) in 1889, and have since declined materially (£15,682,000 in 1900). Cotton manufactures did not figure among exported products prior to the industrial revolution. But in 1802 they exceeded the exports of woolen goods, and rapidly increased until they were three times the value of the latter, and made up the largest single item of exportation. Raw cotton likewise became the greatest item of importation. The value of exports of cotton goods has remained about stationary for the last decades of the nineteenth century. At first cotton was obtained from Brazil and the West Indies, but during the last century the bulk of it has been supplied by the United States, although Egypt now shares largely in the supply. The importation of cotton from India, which became prominent during the Civil War in the United States, is now of quite minor importance. (See INDIA.) At the beginning of the nineteenth century the exports of metal products were still small, but they rapidly increased, the iron and steel exports attaining the highest figures (£37,731,000) in 1873. During the last decade of the nineteenth century the average annual export was near £25,000,000. As the British iron-mines become more difficult to work, and superior ores are found in other countries, the imports of iron ore may be expected to increase. These imports in 1900 were valued at £5,639,000. Other metals, copper, tin, and lead, are almost equal to iron in value as imports, but of much less value as exports. No other article of export has increased in value so rapidly in recent years as coal. The value of the exported product doubled during the decade of 1891-1900, being £38,619,000 in the latter year, and ranking next to cotton manufactures in importance.

Prominent among the causes of the preponderating increase of British imports over exports are the increasing demands of a growing population for food products, and the failure of the domestic production to meet the demand. The imports of grain increased in value from £34,169,000 in 1870 to £58,942,000 in 1900, and the relative increase in meats and animal products was decidedly greater. Of the grain articles, wheat and flour constituted over half the total, over two-thirds of which was from the United States. Corn is next in importance, a similar proportion having been supplied by the United States. Sugar originally came almost wholly from England's West Indian possessions, but the bounty-produced beet-sugar of the Continent has recently taken its place. Tea has long been the principal import from the British East Indian possessions, and lumber from Canada. Until the Boer War gold bullion had for a few years

been the leading export from the English South African possessions, and it is also extensively imported from Australia.

SHIPPING. The extension of the British Empire and of its influence is developed largely through the instrumentality of British shipping; and the maintenance of a merchant navy is considered an essential feature of Great Britain's commercial and Imperialistic policy. The rise of British shipping dates from the time of the Mercantilists. (See COMMERCE above.) The series of Navigation Laws in the seventeenth century were intended to give Britain's vessels a maximum of the carrying trade. Fishing was encouraged in order to train men in a seafaring life, and great pains were taken with marked success by the Government to develop skill in ship-building. The naval victories in the wars with Napoleon gave British vessels almost a complete monopoly in the carrying trade of the world. About that time, however, British shipping began to have a formidable rival in the American merchant fleet. Favored by superior American forest resources, our fleet developed very rapidly, until its tonnage in 1860 almost equaled that of Great Britain. The American Civil War and the change from wood to iron in the construction of vessels resulted, however, in greatly benefiting the shipping of Great Britain and almost ruining that of the United States.

At present the tonnage of Great Britain is over ten times that of the United States, and is larger than the combined tonnage of all the rest of the world. In 1897, 57 per cent. of the ocean carrying trade of the United States was in British vessels. Over 40 per cent. of the external trade of China is carried in British ships, and they hold foremost rank also in the trade with Japan. Two-thirds of the vessels passing through the Suez Canal are British. In 1900 there were engaged in the home and foreign trade, not including vessels employed on rivers and in inland navigation, 7480 sailing vessels, with 1,989,000 tonnage, and 7455 steam vessels, with 7,405,000 tonnage. The sailing vessels decreased from 11,570 during the decade, but the decrease in tonnage was not so great. The steam vessels increased in number during the same period from 5855, and the tonnage from 5,021,000. The number of seamen afloat on British ships is estimated at 235,000.

In 1902 two of the British steamship lines, representing but a small part of the total British shipping, entered a combine controlled by American capital. They will continue to sail, however, under the British flag. The incident gave rise to significant questions as to whether this was the beginning of a policy that might later involve a large part of British shipping, and what the attitude of the British Government would be toward this transaction. Shipping has been greatly facilitated by extensive river and harbor improvements—as, for instance, by the broadening of the river Clyde to Glasgow, and the construction of the ship canal to Manchester. London continues to hold supremacy, not only over British, but over all the ports of the world. It has an advantage in being the best railway distributing centre in England. It receives and distributes the greater portion of the Continental and Oriental trade. Cardiff, as a result of its growing exports of coal, is now next to London in the amount of its annual shipping tonnage. Liverpool, ranking next, is favored by its position for the trade with America, of which it has the greater part. Other important ports are Newcastle, North and South Shields, Hull and Grimsby, Leith, Glasgow, and Southampton.

BANKING. Banking was introduced into Great Britain by the goldsmiths of London in the seventeenth century. The banking systems of England and Scotland have developed independently and naturally along somewhat divergent lines. In England the first connection of the Government with banking occurred in 1694, when the financial exigencies of the nation made necessary the advancement of a loan, and the Bank of England was chartered in order that a loan might be secured. This bank, through special privileges granted it by the Government—as, for instance, giving it the management of the national debt, making it the bank of the Government, allowing it until 1826 the privilege of being the only joint-stock bank in England, and granting it the power to issue notes—has attained an overshadowing prominence among the banks of that country, and even among the banks of the world. The monopoly rights of course implied restrictions on other banks, so that provincial banking in Great Britain is generally admitted to have been inadequately provided for. The Bank of Scotland was organized one year later (1695) than the Bank of England, and it, too, at first (for twenty-one years) enjoyed monopoly rights; but, unlike the English bank, it did not secure a renewal of its patent rights. This gave an opportunity for the growth of other banks, which have coöperated to secure a uniform system of banking throughout Scotland. The formation of joint-stock companies was also permitted with liberal privileges in the matter of issuance of notes. The authorized note issues of Scotch banks may be exceeded, providing there is a specie reserve equal in amount to the excess of the issues, a precaution which, of course, strengthens the circulation. This reserve is considered as part of the cash balance of the bank. The Scotch banks do not lose their rights of issue in Scotland when they open offices or branches in London or in the English provincial towns. In England laws were passed in 1826 which admitted the establishment of joint-stock banks beyond a radius of 65 miles from London, the number of partners not to exceed six. This number was increased in 1862 to ten, except for banks of issue; they are still limited to six.

By the Bank Charter Act of 1844 the issue department was separated from the banking department of each bank, and the issue of bank-notes was limited to those banks already exercising that privilege. These institutions were restricted to a fixed issue, and if they established themselves within a radius of 65 miles from London they forfeited their rights to issue notes. Under these laws the number of note-issuing banks is decreasing, and this function will probably become the exclusive right of the Bank of England unless the laws are changed. The Bank of England notes are legal tender for all sums over £5 except at the bank and its branches, and in Scotland and Ireland. The English and Scotch bankers pursue different policies in matters of interest and commission, the English being inclined to cut rates and to underbid for business, while the Scotch adhere to uniform terms in accordance with an agreement between them. The

policies also differ in respect to the dependence placed upon different sources of profit. In England the directors have more to do in the management than in Scotland, while in Scotland the agents play a more important part than in England. The Scotch bankers have become famous for the perfection attained in book-keeping methods.

In 1901 there were 3 private and 16 joint-stock banks belonging to the clearing-house in London, the process of consolidation having reduced the number in recent years, though at the same time the number of branches has greatly increased. In 1827 there were 465 private and 6 joint-stock banks in England and Wales; in 1900 the private banks had decreased to 21 and the joint-stock banks had increased to 82. In 1900 the joint-stock banks were represented by 3824 branches. In Scotland there are but 11 banks (all joint-stock), with 1077 branches. In June, 1900, the Bank of England, with its 11 branches, had capital reserve and undivided profits amounting to £17,800,000; deposits, £48,500,000; loans and discounts, £30,500,000; and cash on hand and money on call or at short notice, £33,600,000. The corresponding figures for the England and Wales joint-stock banks and branches were respectively £80,400,000, £571,700,000, and £386,800,000, and £136,100,000; for the England and Wales private banks, £7,100,000, £42,100,000, £23,500,000, and £10,500,000; and for the Scotch joint-stock banks and branches, £17,100,000, £103,700,000, £70,500,000, and £25,600,000 respectively. The colonial and the foreign joint-stock banks with London offices have added largely to the total banking business of the Kingdom.

lishment of the postal savings banks. In the last two decades of the nineteenth century the capital of the old savings banks fluctuated about £45,000,000 with a rising tendency at the end of that period, while the postal savings banks increased their capital over four times, the amount in 1899 being £130,118,605.

The scheme for the operation of postal savings banks went into effect in 1861. Deposits, including interest, have a maximum limit of £200. Depositors cannot deposit more than £50 in any one year. Two and one-half per cent. interest is allowed on deposits. The depositor may withdraw his money at once through any postal savings bank in the Kingdom. The number of depositors in the postal savings banks increased from 2,184,972 in 1880 to 8,046,680 in 1899, and the amount they invested increased during the same period from £11,079,137 to £42,145,981. The number of depositors in the trustees savings banks remained about the same during the before-mentioned period, being 1,519,805 in 1880, and 1,601,485 in 1899. The amount invested in the latter banks was £9,008,315 in 1880, as against £12,737,645 in 1899. Penny savings banks and special savings banks for soldiers and seamen have been established. The granting of annuities and the insuring of lives are also provided for through the postal service.

FINANCE. The ordinary expenditures incurred in the maintenance of the National Government are increasing rapidly, necessitating a correspondingly greater national income. The increase in the expenditures and the receipts for the last half of the nineteenth century will be seen in the following table:

EXPENDITURES	1890	1895	1900	Average, 1851–60
National debt	£25,000,000	£25,000,000	£23,000,000	£29,036,000
Navy	15,270,000	17,200,000	26,595,000	10,680,000
Army	17,510,000	17,970,000	20,815,000	15,083,000
Civil Service	10,510,000	10,140,000	11,280,000	
Elementary education	5,080,000	8,750,000	11,250,000	
Imp. revenue to supplement local taxation	5,185,000	7,015,000	9,965,000	
Royal civil list, judicial salaries, annuities, pensions, etc	1,485,000	1,410,000	1,325,000	12,407,000
Collec. of revenue	2,560,000	2,645,000	2,800,000	
Totals	£82,600,000	£90,130,000	£107,030,000	£67,206,000
RECEIPTS				
Excise	£27,130,000	£30,515,000	£35,580,000	£18,118,000
Customs	20,455,000	20,330,000	22,250,000	23,707,000
Income tax	12,780,000	15,650,000	18,870,000	
Death duties	9,150,000	10,900,000	18,400,000	
Stamp duties	6,160,000	5,830,000	8,430,000	24,356,000
House duty	1,980,000	1,460,000	1,700,000	
Land tax	1,050,000	1,020,000	740,000	
Totals	£78,705,000	£85,705,000	£105,970,000	£66,181,000

SAVINGS BANKS. A savings bank was established in Scotland in 1810, and soon after such institutions became established in different parts of Great Britain. Under the law of 1817 and subsequent laws, these banks were placed under the regulation of the Government, and during the second quarter of the nineteenth century they enjoyed a rapid growth. The deposits of these banks are turned over to the Bank of England, which allows a specified rate of interest upon them. The rate of interest paid depositors varies, but is in excess of that ordinarily paid by banks. The trustees are prohibited from receiving any profits. The growth of the old, or trustees, savings banks was checked by the estab-

The above table does not show the receipts and expenditures of the post and telegraph service, except that these items are included in the figures for 1851-60, but were not large. These receipts and expenditures in large measure at present cancel each other; the receipts in 1900 being £16,580,000, and the expenditures £12,850,000. Neither do the figures show the recent extra expenses incurred by the Boer War, the total war charges for the year 1900-01 being £68,620,000. It will be seen that the largest absolute increase for the last decade of the nineteenth century was that incurred by the navy, this having now become the largest item of the ordinary expenditure. The expense of the army is also becoming heavier.

The greatest per cent. of increase in any single expenditure item was that incurred for elementary education. After the item of the army and that of the navy, the service of the national debt (see table) is at present (1903) the largest item of the annual expenditure. As a result of the change in the tariff policy of the country, the customs duties are relatively of much less importance than they were in the middle of the nineteenth century, although they have almost held their own absolutely. The collections from the excise duties, on the other hand, have about doubled during the same period. The death duties and the income tax have latterly become very important sources of revenue.

The British budget is characterized by simplicity, and by its attempt to adjust the burden imposed in such a manner as will make it least felt, i.e. in accordance with the ability of people to pay. The income tax was first resorted to in 1798 as a special means of raising revenue for war purposes. From 1815 to 1842 it was abolished, but was revived at the latter date in consequence of the reduction of the corn taxes. This tax now meets with general approval, and has become a permanent feature in the national budget. Incomes under £160 are exempt from the operation of the tax, and the moderate incomes, or those below £700, are favored by abatements. The income tax is made to fluctuate more or less as the annual exigencies of the budget may demand. The income-tax rate has gradually increased from 2*d.* per pound in 1874, until in 1901-02 it stood at 1*s.* 2*d.* per pound. Like the income tax, the death rates operate to favor the masses. The most important fiscal change made in the last quarter of the nineteenth century was the readjustment of the death rates in 1894 so as to increase the rates and to extend their application to include all the estates probated, thus adding greatly to the returns which this tax yields. The most important of this class of taxes are the estate duties and the legacy duties, which in 1901 were respectively £8,498,872 and £3,092,380. Since 1851 there has been a house tax taking the place of the old window tax assessed prior to that date. This tax is not levied upon property rented for less than £20 per year, thus exempting the houses of the working classes.

In 1840, before the introduction of the free-trade policy (the sweeping corn laws were passed in 1846, and the policy became fully operative about 1860), 1046 articles were taxed. In 1901 the number had been reduced to 23 articles. The articles now taxed are those not produced in the United Kingdom, or such as are considered as luxuries, the latest article in the category of necessary products, sugar, having been placed upon the free list in 1874. The exigencies of the South African War, however, led to the reimposition of a duty upon sugar, the raising of the duty upon tea, tobacco, spirits, and beer, and the assessment of an export duty on coal. Tobacco and tea are the chief customs revenue producers, yielding respectively in 1901 £12,838,578 and £6,264,515, other taxed articles being rum, brandy, and other spirits, wine, coffee, currants, raisins, and cocoa. The principle of protection is generally considered to have been wholly abandoned in the British revenue policy, but in fact the tariff is still in a limited way highly protective, and is shaped expressly to aid British manufacturers. Thus a distinction is made between raw cocoa and the manufactured cocoa, roasted and unroasted coffee, manufactured and unmanufactured tobacco; and the distinction is sufficiently large to guarantee the importation of the raw products, and render possible the prosperity of the home industries based upon them. In 1901 the import duty on unmanufactured tobacco was from 3*s.* to 3*s.* 4*d.* per pound and on manufactured tobacco from 3*s.* 10*d.* to 5*s.* 6*d.* per pound. Raw coffee was taxed at 14*s.* per hundredweight, while kiln-dried was taxed at 2*d.* per pound. The minimum tax on tea was 3*s.* 7*d.* and the maximum 4*s.* 4*d.*

The British fiscal system applies uniformly to England and Wales, Scotland and Ireland, with the exception that Ireland is exempt from the land tax and the inhabited-house tax. It is interesting to note the different results realized from the application of a uniform policy to kingdoms so differently conditioned. It has been shown by Mr. J. W. Root that, omitting licenses (which scarcely benefit the Imperial exchequer), the proportion of the direct to the indirect taxes for the United Kingdom is as 46 to 54, whereas the proportion of direct to indirect taxes (1899) in the different kingdoms are as shown in the following table, together with the per capita value of the taxes:

	Direct taxes	Proportion direct to indirect	Ind. taxes	Dir. per head	Ind. per head	Total taxes	Total per head
	£		£	*s.* *d.*	*s.* *d.*	£	£ *s.* *d.*
England and Wales	37,585,000	48 to 52	40,460,000	19 8	25 6	78,045,000	2 5 2
Scotland	4,050,000	39 to 61	6,430,000	16 0	30 1½	10,480,000	2 6 1½
Ireland	1,950,000	27 to 63	5,250,000	6 5	2	7,200,000	1 9 7

The Irish portion of the license duties is included in the direct taxation.

It will be observed that the burden of the indirect taxes is relatively much heavier in Scotland and Ireland than in England. Presuming that the direct tax is the better measure of the wealth of the country, the per capita wealth of England is much greater than that of the other two kingdoms, particularly Ireland, the contrast becoming prominent when shown as based upon returns of the income tax:

	Income tax	Income tax per head
	£	*s.* *d.*
England	15,284,000	9 8
Scotland	1,809,000	8 6
Ireland	704,000	3 2

The inference is, therefore, that the actual application of a uniform scheme of taxation inflicts a severer burden upon Scotland, and especially upon Ireland, than upon England.

The local taxes are annually supplemented by appropriations from the Imperial revenues. The levying and collecting of the local rates are in

the hands of the elected local overseers, the valuation list being made to include every class of property. The rates for real property are based upon the annual value of the property as determined by the amount it will rent for. The town councils, boards of guardians, and school boards are the local spending bodies. In recent years local expenditure and indebtedness have increased rapidly. British municipalities have become noted for their activity in assuming the ownership and control of productive properties, ofttimes receiving the net revenue from this source.

National Debt. Great Britain sustains the burden of a heavy debt which is exceeded only by those of France and Russia. It is three times as great as that of the United States. The beginning of the debt dates from the reign of Charles II., and in 1688 amounted to £664,263. The wars of William III. raised it to £12,767,225, and by the commencement of the American war in 1775 it had increased to £126,842,811. The war with the American colonies almost doubled this figure, leaving it in 1784 at £243,063,145. This was followed by the enormously expensive Napoleonic wars, which augmented the debt until in 1815 it was £861,039,049. At the commencement of the Crimean War in 1854 it had been reduced to £804,226,354, and at the end of that war it stood at £836,144,597. From that time it decreased rapidly until 1899, when it stood at £627,562,685; but the expenditure for the Boer War raised it again until it reached £690,922,622 in 1901. Of this the funded debt amounted to £551,182,153, the terminal annuities (estimated capital value) £61,677,409, and the unfunded debt £78,133,000. A large part of the national debt is in the form of the famous British consols, or consolidated annuities, the principal of which is payable only at the pleasure of the Government.

Weights, Measures, and Coinage. Two systems of weights and measures are legal not only in Great Britain, but throughout the British Empire, namely, the Imperial and the metric. The Imperial system is constituted from a variety of ancient, and of customary, trade denominations, and was legalized in 1824. The metric system was permitted to be used for retail trade in 1897, though it had been employed for many years prior to that by chemists, physicists, and manufacturers. Standards of weight and measure are kept at the standards department, Old Police Yard, Westminster, under the custody of the Board of Trade; with these standards other standards must be compared and verified. In practice the ancient native weights, measures, and coinage are still in common use in India. See India.

Defense. The system of defense and the military and naval arrangements of Great Britain are peculiarly distinctive of that country. The predominating factors in the situation are the insular position of the country and the vast extent of foreign domains that need protection. Both of these conditions unite in making England's safety dependent upon the strength of its navy, and accordingly this has long received the chief attention from the Government. The general plan is to keep the navy at least as powerful as the combined navies of any other two countries. The strength of the navy more than doubled in the last fifteen years of the nineteenth century. The personnel is recruited by voluntary enlistment. Preparation for the service begins between the ages of fifteen and sixteen and one-half years, a term of two years being served in the training-ships, at the end of which period the recruit may be drafted into the fleet to serve for a period of twelve years, when he may leave the service or reëngage for an additional period of ten years. The mercantile marine is depended upon to supply a naval reserve, the State having made arrangements whereby a certain number of merchant seamen may secure a given number of days' drill annually, and engage themselves to join the navy if an emergency should make it desirable.

In the last decade of the nineteenth century the colonies began of their own free will to share in the expense of the maintenance of the Imperial navy. In 1901-02 the total number of men and officers serving in all the ranks was 118,625. The administration of the navy is vested in a Board of Admiralty, the head of which, the First Lord of the Admiralty, is a Cabinet officer. (For the details of the organization, administration, and the statistics of the British Navy, see the article Navies.) In case of attempted attack or invasion, the navy is depended upon to prevent a landing, and the importance of forts and their garrisons is therefore less than in the Continental countries. Some sort of defense is provided for all the principal ports of Great Britain and Ireland, including London, Hull, Newcastle, Leith, Aberdeen, Glasgow, Liverpool, Cardiff, Bristol, Plymouth, Portsmouth, Dover, Chatham, and Belfast. The efficiency of the navy is greatly strengthened by the establishment of numerous naval bases and coaling stations which its widely distributed possessions have made possible. The following enumeration does not include a large number of small coaling stations. In North America and the West Indies there are Saint Johns (Halifax), Bermuda, Port Royal, Port Castries, Port au Spain, Saint John (Tobago); and on the Pacific, Esquimalt on Vancouver Island. In South America there are Port Stanley (Falkland Islands), and Coquimbo in Chile, while vessels are also permitted to coal in the Rio de la Plata and at Rio de Janeiro. On the west coast of Africa and in Cape Colony there are Sierra Leone, Cape Coast Castle, Cape Town, and Simon's Bay, besides the islands of Ascension and Saint Helena. In Australia there are Sidney, Melbourne, Albany, and Hobart (Tasmania), and in New Zealand, Wellington, Auckland, and Christchurch besides. In the Fiji Islands there is Suva. Belonging to the East Indian naval station are Aden, Bombay, Colombo, Trincomali, Port Louis, Zanzibar, and Port Victoria. In the Mediterranean are Gibraltar and Malta and a coaling station at Port Said.

While Great Britain overshadows all other countries in the strength of its navy, its standing army is greatly surpassed by those of its principal Continental neighbors. In 1901-02 the total number of men and officers in all ranks was 219,800. The main function of the British standing army is the defense and control of the extensive colonial possessions, and it is considered necessary that forces sent to distant possessions be enlisted for longer terms than could be reasonably demanded for conscripts. Consequently, unlike other European countries, enlistment is voluntary, and the average term of active service is

much longer than on the Continent. The term of active service is from three to seven years, the length of service in the reserve varying from five to nine years. The control of the people over the army is secured by the constitutional authority of the National Parliament to prohibit, if it choose, the maintenance of an army in times of peace, and by the necessity of an annual grant for its financial support. A Cabinet officer—the Secretary of State for War—is at the head of the army administration. (For details of the army organization, administration, and statistics, see ARMIES.) The military relation of Great Britain to its colonies presents some interesting aspects. The Imperial forces have been withdrawn from all the self-governing colonies except Natal, and local responsibility for self-defense has become a recognized principle. The contributions of military forces by the colonies during the late Boer War proved the loyalty of these dependencies, and revealed a source of strength which is of great moment to the Imperial cause. The British forces stationed in India are supported by taxes raised in that country.

POPULATION. The first official census taken of Great Britain was in 1801. Estimates have been made of the population of England upon the basis of the Domesday record. These estimates place the total in the latter half of the eleventh century at a little less than 2,000,000. Over half of the population was then centred in Southeastern England—in the counties north and south of London—the Norman Conquest having depopulated vast districts in Northern England. Investigators claim that it took over five centuries to double this figure, the greatest increase being made in the Elizabethan reign, after which time the population remained stationary for a century and a half. The lack of communication resulted in frequent starvation periods in numerous localities. This, together with occasional plagues, prevented a regular and normal increase. The great modern growth in population is contemporaneous with the change in the industrial system and the improvement in means of communication. The most remarkable feature in this development is the drift of the population from the south to the north. The lands in the north, which had been so long deserted, have finally become the most densely populated portion of the British Islands. This movement northward assumed full momentum when improved inventions and methods made it desirable to secure for manufacturing the aid of water-power such as was best supplied by the streams of Lancashire and Yorkshire. Still later, when coal and iron became extensively drawn upon, the supply of these minerals also was found to be situated in this northern district. The greater moisture of the atmosphere in this region, as indicated above, increased its desirability as a textile manufacturing centre, and consequently encouraged the growth of its population. The manufacturing and mining district around Manchester and extending southward to Birmingham is the most densely populated district of equal area in Great Britain, or in the world, with the possible exception of certain districts of China. The next five most populous districts are a small region surrounding London, and the Lowland region of Scotland. The density per square mile of the population of the principal divisions of Great Britain in 1901 was: England, 606; Wales, 230; Scotland, 150. The population of these kingdoms together with Ireland for the years 1821, 1861, and 1901 will be seen in the following table, together with the percentage of the total population of the United Kingdom which each country constituted in these respective years, and also the percentage of increase of each country for the decade 1891-1901:

	1821		1841		1861		1881		1901		Percentage of increase 1891–1902
United Kingdom	20,893,000		26,731,000		28,927,000		34,884,000		41,454,000		9.9
		%		%		%		%		%	
England	11,282,000	54.0	15,002,000	56.1	18,954,000	65.6	24,614,000	70.6	30,805,000	74.3	12.1
Wales	718,300	3.4	911,700	3.4	1,111,700	3.8	1,360,000	3.0	1,721,000	4.1	13.3
Scotland	2,091,500	10.	2,620,000	9.8	3,062,000	10.6	3,735,000	10.7	4,472,000	10.8	11.1
Ireland	6,802,000	32.6	8,196,000	30.7	5,799,000	20.0	5,175,000	14.8	4,456,000	10.8	5.3

The increasing importance of the manufacturing and the mining industries as against agriculture has given England a larger percentage of urban population than is found for any other country. In 1901 the urban population amounted to 77 per cent. of the total in England and Wales, and 75.3 per cent. in Scotland. The great concentration of population is strikingly brought out in the following table, which is taken from a study made of England and Wales for the ninety-year period 1801-91:

	Acres	Population		Inc. per cent.		
		1801	1891	1801–31	1831–61	1861–91
283 towns including London	1,929,724	3,425,000	16,881,000	81	70	60
224 smaller towns	808,000	462,600	1,800,000	61	47	63
70 new towns	359,000	89,800	1,257,000	121	168	136
Populous areas (old)	346,790	227,500	660,000	57	35	38
Populous areas (new)	2,087,000	529,300	2,673,800	63	67	85
Belt round London	209,900	54,600	195,200	52	35	74
Rural districts	31,577,000	4,103,000	5,534,400	33	7	decrease 5
England and Wales	37,317,885	8,892,500	29,002,500			

It will be seen that the population of the 283 largest towns was in 1891 nearly five times that in 1801, while on the contrary the

large rural area, which in 1801 contained nearly half of the total population, made only an insignificant gain compared with that of the whole country, and actually suffered a decrease in the last thirty-year period. A study of Scotland would reveal a similar movement of the population. The following table shows the population for towns having above 200,000 inhabitants in 1901. There are sixteen such towns as against nineteen for the United States, although the population in the latter country is more than twice that of Great Britain. London's steady growth has kept it far in advance of all other cities of the world in population.

CITIES	1861	1891	1901
London	2,804,000	4,228,000	4,536,000
Glasgow	394,800	618,052	760,400
Liverpool	443,900	629,500	685,000
Manchester	338,700	505,300	544,000
Birmingham	296,000	478,000	522,000
Leeds	207,000	367,500	428,000
Sheffield	185,000	324,200	380,700
Bristol	154,000	289,300	328,800
Edinburgh	168,000	264,796	316,400
Bradford	106,200	265,700	279,800
West Ham	.....	204,900	267,000
Hull	97,600	200,400	240,600
Nottingham	74,600	213,800	239,700
Salford	102,400	198,000	221,000
Newcastle-upon-Tyne	109,000	186,300	214,800
Leicester	68,000	174,600	211,000

The gain in the population of Great Britain has been made in spite of the fact that so many of its inhabitants have migrated to its colonial possessions, or other countries. The largest exodus was during the period of 1880 to 1893, when the English emigration averaged over 150,000 annually, and the Scotch over 95,000 annually. Since that period the emigration has averaged less than two-thirds of this total amount. This is proportionately much less, however, than the emigration from Ireland. (See IRELAND.) The United States received about two-thirds of the whole number. At the time of the famine in Ireland (1845 and subsequent years), a large number of Irish came to Great Britain, and in recent years there has been an increase in the immigration from other countries to Great Britain, Russian and Polish Jews, Belgians, and Germans being the most numerous. The figures for the immigration and for the emigration in Great Britain at the end of the nineteenth century were almost equal. The immigrants in 1900 were 175,747, against 151,369 in 1891. In 1901 there were 15,721,728 males and 16,804,347 females in England and Wales; in Scotland, 1,942,717 males and 2,082,930 females. The birth-rate is decreasing, being, for England and Wales, 29.3 per thousand living persons in 1899, as against 35 in 1871. The loss in the growth of population is largely offset by the decrease in the death-rate which in 1871 was 22.6 to each thousand individuals, as against 18.3 in 1899. The marriage-rate for the United Kingdom in 1899 was 16.5 per thousand of the population. In 1891 there was 51.2 per cent. of the population of Wales and Monmouthshire who could speak Welsh, 22.6 per cent. of whom could speak English also. In 1881 70 per cent. of the population could speak Welsh. In 1891 there was 6.32 per cent. of the population in Scotland who could speak Gaelic, which was slightly greater than the corresponding percentage in 1881. Those who spoke Gaelic only numbered 1.09 per cent. of the population. See IRELAND.

RELIGION. In England and Wales, in Scotland, and in Ireland, different churches are dominant: in the first, the Protestant Episcopal; in the second, the Presbyterian; and in the third, the Catholic. In the first two the respective churches are the established State churches. The Protestant Episcopal Church was also the established Church of Ireland from 1801 until disestablishment in 1871. The religious reformation of the sixteenth century was received differently, and followed different courses in each of the three political divisions. In England and Wales the Church maintained its organization unbroken, simply severing its connection with Rome. The movement in Scotland was more radical, necessitating a new organization. In Ireland the native Irish element remained loyal to Rome, only the limited English population revolting. But while the respective churches which the Reformation left in power in the three kingdoms are still the predominant organizations, their majorities have been reduced, and the present religious status differs much from that of the earlier time.

The changes have been most marked in England and Wales. From the first there were Dissenters from the State Church; and the Presbyterians, Congregationalists (or Independents), and Baptists date from this early period. Just prior to the rise of Cromwell the Dissenters had apparently secured considerable power; but the attempt to make the Presbyterian Church the established Church (1648) failed. Of course the Puritan, or virtually the Dissenting, element were dominant during Cromwell's revolution and rule. In the reaction following this reformation the ranks of the Dissenters were much reduced, and it was not until the religious revival of the next century that they again began to become prominent. In 1700 it was estimated that the Dissenters numbered less than one-twentieth of the English population. In the eighteenth century a sort of religious indifference settled over the country, from which it was aroused by the ardent enthusiasm and the simple faith that characterized the preaching of Wesley and his Methodist following. Wesley himself remained a member of the State Church, and desired that his followers should not be separated from it; but divergence from the Established Church was carried too far for this to be possible, and after his death the Methodists became organized (1795) as a separate body. The spirit of the movement was taken up, in a degree, by other bodies, and the older dissenting churches, particularly the Congregationalists, enjoyed a considerable growth in membership. In the course of time there were a number of divisions within the Methodist Church, but the Wesleyan Methodists, with a little over half of the entire Methodist following, are stronger than any other dissenting Church. In the absence of any religious census, the strength of the different elements is estimated upon some such basis as the percentage of marriages celebrated according to the rites of the different bodies.

In 1899, in England and Wales, the Episcopal rites were used in 67.8 per cent. of the marriages, the Catholic rites in 4.1 per cent., while the ceremonies in the registered places of other denominations numbered 12.4 per cent., and the

civil marriages amounted to 15 per cent. It is estimated that the number of people not in the Established, Catholic, or Jewish churches, who are therefore presumably Dissenters in sympathy, is considerably over one-fifth of the total population. After the Methodists, the Congregationalists and the Baptists respectively are strongest, the Presbyterians following with a much smaller number, the members of this Church being most numerous in the northern counties of England. The Dissenters are strongly predominant in the northern counties of Wales, and attempts have been made to secure the disestablishment of the Episcopal Church within Wales. The Catholic Church had remained quite small in England and Wales until the influx of the Irish in the famine years from 1845 on. More recently the Catholics have secured many converts from the Established Church. In 1900 their number was estimated at about 1,500,000. The Church of England is not composed of homogeneous elements. On the contrary, on account of its latitudinarian policy, widely diverse factions are retained within its organization. Since about 1850 the High Church element, representing a reactionary movement toward a greater ceremonial, has become predominant, while the Broad Church movement, which stands especially for a more liberal theology, has also grown at the expense of the old Low Church.

The changes have not been so marked in Scotland, Presbyterianism having a much firmer hold upon that country than Episcopacy has upon England. Both the Episcopal and the dissenting churches mentioned above have secured a footing in Scotland, but have never become strong. Latterly the Catholics have had a growth in Scotland similar to that in England, and in 1900 their number was estimated at about 365,000. However, Presbyterianism itself has had an eventful course, undergoing a number of schisms. The Established branch, though still containing over half of the total number of Presbyterians, contains less than half of the Church communicants of the country. When, after the union with England, Parliament gave lay patrons the right to present clergymen to vacant benefices, the ensuing dispute resulted, in the early part of the eighteenth century, in two divisions, the seceding bodies afterwards uniting and becoming known as the United Presbyterian Church of Scotland; and finally in 1843 the same question resulted in another division from the Established Church, which gave rise to the Free Church of Scotland. In 1900 this body effected a joint organization with the United Presbyterian branch under the name of the United Free Church of Scotland. Of the minor divisions of the Presbyterian Church, the most important is that known as the Reformed Presbyterian. Neither the Established Church in England nor the Established Presbyterian Church in Scotland receives any State financial aid. The support of the Episcopal Church is secured mainly from the local endowments of the individual churches.

In Ireland the Celtic element has persistently stood by the Catholic faith, but the early influx of Scotch Presbyterians and English Episcopalians and the very heavy emigration of the Catholics in the nineteenth century have resulted in appreciably reducing the Catholic percentage. The Episcopalians, who in 1901 numbered about 579,000, or 13 per cent. of the population, are centred in Dublin and the eastern portion of the island. The Presbyterians, with a membership of 443,000, are confined largely to the northeastern part. There are 61,000 Methodists.

Jews are not numerous in the United Kingdom, 150,000 being given as their number in 1901. They are confined to London and a few of the other large towns. The organization of the different denominations represented in the United Kingdom will be given under the respective titles of those bodies. See also IRELAND.

EDUCATION. There has been a very marked contrast between the development of the educational system in England and Wales and its development in Scotland. In the former kingdom there was no public-school system until the nineteenth century was well advanced, and its development then was very slow, being hampered throughout by a bitter religious controversy. In Scotland provision was made for public schools before the close of the seventeenth century, and the system developed without serious embarrassment from religious controversies, and has always ranked much in advance of the system in the southern kingdom. During the earlier centuries a large number of endowments had been established in England, administered usually under the auspices of some religious sect; but the instruction was usually defective, comprehending little more than the dead languages. So little regard was exercised over the administration of these endowments that abuse was easy, and many of the endowments were lost or diverted into other channels. The scheme of education embraced but a small part of the population, and the educational status compared very unfavorably with that existing in some of the Continental States.

In the early years of the nineteenth century an interest began to be aroused in behalf of a more general diffusion of education. Two rival organizations were established for that purpose. The British and Foreign School Society, dating from 1808, represented the dissenting religious element, and its board schools were carried on in accordance with a plan advocated by its leader, Joseph Lancaster. No dogma was taught, but the Bible was read. The National Society (1811), on the other hand, followed the ideas of Andrew Bell, and made religion and the interests of the Established Church prominent in the national schools which they founded. The growth of interest in education resulted in the appointment of a committee from the House of Commons (1816) to inquire into the nature of elementary instruction, and in 1818 of a royal commission to inquire into educational charities. But no financial aid was given until 1833, when $100,000 was granted, this being divided between the educational societies. Inspection was soon made a condition to receiving aid, and the rival factions secured the right to approve the inspectors who were to examine their respective schools. In 1856 an educational department was founded to administer the Government grant. 'Payment by results' became the ruling principle in the distribution of funds, the 'results' being determined by the examination held by the inspector in the subjects of reading, writing, and arithmetic. In 1869 the school accommodations were only half those required, though they had doubled in the decade ending in that year. In 1870 the Elementary Education Act was passed,

establishing the basis of a general educational system which is still in force. It attempted to provide for the education of all children between the ages of five and fourteen; annual Parliamentary grants were to be shared by the public and the private schools on the same conditions; there was to be a central administrative agency, and wherever the local needs were not amply provided for, school boards were to be elected and board schools established; in the board schools no religious catechism was to be taught, though religious instruction might or might not be given, and in the voluntary schools religious instruction could not be forced upon a child if its parents objected. In 1872 a similar system was established for Scotland, but with elected school boards for every parish, and these have charge of higher as well as elementary education.

Scotland has its own central administrative board. In 1900, the separate departments of education and science, which had formerly existed in England, were united under a board of education. This board is expected to secure a better systemization of the secondary and technical departments of instruction. The central authorities are assisted by a corps of inspectors and sub-inspectors. Every religious body now conforms with the conditions prerequisite to receiving aid. In England the voluntary schools still enroll over half the school attendance, their predominance being greatest in the smaller towns and rural districts. In Scotland the voluntary schools enroll (1897) only 22 per cent. of the school attendance. Education is now compulsory in both England and Scotland for the age period from five to fourteen, though under given conditions total or partial exemption may be secured at the age of eleven in England and of twelve in Scotland. In districts in which there are no boards, school committees are appointed to secure the enforcement of the law in regard to attendance. Kindergarten work is given a prominent place in the elementary system. Women may be elected members of the school boards. Complete illiteracy records are not taken, but estimated upon the decided decrease in the proportion of persons who cannot write their names on the marriage register—a decrease from 123.4 per thousand for husbands during the period 1881-85 to 29 in 1899—illiteracy is being rapidly stamped out.

Secondary and Technical Education. There is no secondary educational system in England, although a number of elementary schools give advanced secondary courses as well, a considerable number being admirably equipped for this work. There is, however, a large number of secondary schools maintained by private enterprise, endowment, subscription, etc. It was the endowed boys' schools of this class that in earlier years had been especially subject to abuse, but the investigation of the royal commission and the consequent passing of laws and the establishment of the endowed schools commission in the sixties resulted in revolutionizing the methods of these schools. In 1897 there were 158,000 boys and 133,000 girls attending such voluntary schools, one-fourth of whom were boarders. These schools emphasize distinctions based upon social caste, and some of them are very exclusive. In Wales each county has an educational council, and over all is a central board with powers of inspection and examination of the secondary schools. Through these agencies secondary education is amply provided for in Wales.

In Scotland, as we have already noted, school boards may establish secondary schools. Secondary and technical as well as elementary work is done at the evening continuation schools. The number of these schools and of their attendance has increased very rapidly, the enrollment in England having risen from 115,582 in 1893 to 358,268 in 1897, the average attendance for the year 1900 being 206,335. The Scotch provision for evening continuation schools is almost identical with that of England. In England and Wales there is no thoroughly defined system of technical instruction, although, through the assistance of special grants, manual training and the industrial arts and sciences are given considerable attention, while the municipalities have been active in securing the erection of technical institutions. In Scotland technical schools may be established by the school boards.

Teachers. The early schools of Lancaster and Bell used the older pupils as teachers for the younger, the plan being known as the monitor system, which with some modification became known later as the pupil-teacher system. This class of teachers is now decreasing in number, and in 1890 was less than one-fifth of the total number in England and Wales. There are a large number of teachers' colleges, and the universities generally provide training courses for teachers. Both of these types of schools are inspected and subsidized by the Government. The graduates of these schools are known as certificated teachers, and at the end of the nineteenth century those graduating annually amounted to two-thirds the number needed. Those passing the examination for a teacher's certificate without taking the normal course became known as assistant teachers, and these constituted (1900) nearly one-third of the total. There are more than twice as many female as male teachers. In Scotland the proportion of trained and of pupil teachers is considerably greater and of assistant teachers considerably less than in England and Wales. Teaching has become recognized as a life profession. In 1898 a Parliamentary law was passed applicable to England, Scotland, and Wales, which provides a pension for teachers attaining the age of sixty-five years. In recent years there has been a decided increase in salary, so that the profession has become well paid. In 1897 the average salary of certificated male teachers was $613, and female teachers $407.

Finance. The system of payment by 'results' grew into disfavor through the belief that it favored perfunctory methods of instruction, and after a number of modifications, in which the principle was partially retained, it was finally given up almost entirely (1895). The grant is now distributed, practically on the basis of average attendance, to all schools that conform sufficiently with the requirements in the estimation of the inspectors. In Scotland the old principle is recognized to the extent that the amount of the grant may, upon the recommendation of the inspector, be reduced because of inferior instruction to even one-half the regular rate. In 1891, a law was passed providing grants to all schools remitting fees, thus practically establishing free elementary instruction. A law of 1897 allows an extra annual grant to voluntary schools. These, however, are not allowed to share in the

local taxes, as are the board schools. The same distinction is made in Scotland as in England and Wales in the support of board as against voluntary schools. The total expenditure for education increased enormously in the last decade of the nineteenth century, the increase being almost wholly on the part of public and national contributions as against the voluntary and local. In 1900 the local income for elementary schools in England and Wales from all sources, public and private, amounted to £4,334,005, and was somewhat less than in 1891, while the Parliamentary grant for the year 1900 was £8,234,202, or two and one-half times that of 1891. The receipts of the school boards in Scotland in 1900 amounted to £2,543,873.

Universities. Great Britain in proportion to population does not make as ample provisions for university education as is made in most other European countries. There was, however, in the last half of the nineteenth century a remarkable increase in the number of universities and in their attendance, and the sphere of their influence has been decidedly increased. The new colleges which have grown up have not been hampered with the restrictions which tradition has imposed upon the two old English universities, Oxford and Cambridge, and greater emphasis has been placed upon science and the adaptation of their courses to the practical demands of the local industrial conditions. The London University constituted an examining body in 1836 (when the original London University, founded in 1826, became University College), and was transformed into a teaching body in 1898, comprehending in 1900 twenty-four different colleges, with an enrollment of 4789. In 1878 colleges situated at Manchester, Leeds, and Liverpool, respectively, were federated under the title Victoria University. The Durham University, established in 1832, was extended in 1871, so as to include the colleges of medicine and science at Newcastle-upon-Tyne. Birmingham University was constituted in 1900. All of these were established through the aid of private beneficence, but now receive aid from the Government. In 1900 Oxford had 3481 students, and Cambridge in the following year had 2958. The University of Wales, composed of a number of affiliated colleges situated at different points, was established in 1893. The four Scotch universities, Saint Andrews, Glasgow, Aberdeen, and Edinburgh, date from the fifteenth and sixteenth centuries. The financial status of the Scotch universities has recently very greatly improved, and since the further extension of the secondary system of education in Scotland the universities are enabled to give more attention to the strictly university work and less to preparatory courses.

The necessity of signing the Thirty-nine Articles in order to matriculate at Oxford and Cambridge was removed in 1854, as was also, in 1871, the exaction of religious tests as a condition of securing degrees, except for the theological degree. In the last quarter of the nineteenth century women were admitted to the university examinations in a number of branches at Oxford and Cambridge, and colleges for female students have been established in connection with both institutions. In 1878 London University opened all its faculties to the examination of women on perfect equality with men, and the Victoria and Durham universities and those of Scotland and Wales have since followed the example. The effort to extend the advantages and influence of the universities gave rise in the latter decades of the nineteenth century to the custom of affording, at various points, courses of lectures and class work, and holding summer meetings, etc., for the benefit of non-resident and non-matriculated students. This system is generally known as university extension work. Furthermore, a system of local examinations under administration of the universities has grown up, certificates being granted to successful candidates.

Charities. The history of charitable effort in England is more comprehensive and offers more of interest and value than that of any other country. Like other phases of English history, it treats of a continuous growth; it is in a measure a running commentary upon the changing social life. During the time when the manor was giving way to the parish, yet before the hand of the Church had become overshadowed by that of the State, the performance of the charitable function was largely a matter which concerned the Church, and almsgiving was looked upon as a religious duty. The parish became the most common unit of relief, but the monasteries which were scattered over the country also placed much stress on works of charity, and numerous hospitals were established through the instrumentality of the hospital orders, which for a time played a conspicuous part. The monasteries and the hospitals received large endowments, generally in land. These constituted a remunerative source of income. There was a lack of coördination. The giving was indiscriminate; there was little regard to need or social consequences. When the towns grew up and the guilds became powerful, the changed conditions were reflected in the system of charity relief by the establishment of institutions by the municipalities, or by the different guilds for the benefit of their members. Indeed, the towns had acquired a considerable experience in dealing with the poor before the State took the problems in hand, and the policy of the State was largely borrowed from the municipalities. The breakdown of the feudal system and the transition from general agriculture to sheep-farming had been characterized by migrations of the population and increased vagrancy.

All this the State vigorously though vainly attempted to suppress. It was not until the Reformation that the State began to deal with the general question of pauperism. By the destruction of monasteries the State had incurred the obligation of providing some means of relief in their stead. Moreover, in consequence of the change in religious thought, almsgiving was looked upon less and less as a duty, and the members of parishes did not contribute so liberally. Accordingly, during the reigns of Henry VIII. and Queen Elizabeth a general State policy in dealing with the question was rapidly developed. The process of transformation from Church to State was a gradual one. The parish continued to be the unit of Church collections, and the State and Church officers coöperated in its administration. Church collections of alms passed into quasi-voluntary contributions, and then, as additional steps were taken to enforce collection, it became a regularly assessed local poor rate. A compulsory rate was definitely fixed by an act of 1601. This act established the foundation

principles of the poor-law policy. These principles, though subsequently expanded and supplemented, are still recognized. Children were to be provided for through apprenticeship. A distinction was made between adults who were able to work and those who were not, relief being extended to the latter, while the former were forced to work. In practice the system operated very unevenly in different parishes, since the lack of centralization in the system, and the want of adequate guaranties for proper administration, enabled the local authorities to act arbitrarily—ofttimes unwisely and not infrequently to their own selfish interests.

In 1610 an act was passed looking to the establishment of Houses of Correction in every county, but these were not intended as disciplinary institutions. The continued migration of vagrants led to the creation in 1662 of a law of settlement which was sadly out of harmony with the changing conditions of the times, and proved a heavy burden upon the industrial and social life of the country. According to this law settlement could be acquired in forty days, but the individual could be removed during that time if it was considered that he was likely to become needy. In consequence of the enforcement of this act, it often happened that one parish would be permanently afflicted with paupers. Even the worthy were unable to settle in a neighboring parish, which perhaps was almost equally unfortunate because of the lack of laborers to perform the work required. The resulting social condition has been aptly termed a system of statutory serfdom. In 1723 a law was passed making possible the general establishment of workhouses and the application of the important principle that these might be used as a test of need, and relief outside of the workhouses might be refused to the able-bodied. This improved conditions for a time, but the law was allowed to fall into disuse. During the industrial revolution about the end of the eighteenth century there were naturally many persons who did not conform with the changing conditions, and the pauper element rapidly increased. Moreover, the development of a greater humanitarian sentiment gave rise to a profligate generosity which was reflected in the poor-law legislation of the period.

The Gilbert Act (1782), while creating the Poor-Law Union and introducing some other improvements in the system of administration, directly violated the principle of the workhouse test by making it possible to give outdoor money aid. Another step in the same direction was taken in 1795, when the policy was introduced of supplementing the ordinary wage of the laborer with money aid, the amount of which was increased in proportion to the number of members in the family. The evil wrought by these measures was great. It destroyed the sense of personal responsibility and the incentive of initiative. The larger portion of the agricultural laborers became pauperized, relief was expected, and disgrace no longer attached to it. It led to a reckless contraction of marriages and an abnormal birth-rate in pauper families. It was estimated that in 1802-03 28 per cent. of the population in England and Wales was in receipt of either permanent or occasional aid. It made it possible for wages to be cut, and the self-dependent man was often refused employment; in fact, his lot became worse than that of the pauper. Great recklessness in expenditure was common, the poor rates became enormous, and although most classes of the population had coöperated in carrying the policy to an extreme under the presumption that it served their personal interests, the abnormal status of society was too patent to escape exposure long. Parliament appointed a commission to investigate the whole question of the poor relief. As a result of the report of this commission in 1834, measures were taken by Parliament which mark the beginning of a new epoch in the poor-law administration.

The cure of the evils existing prior to this report was a matter mainly of securing an efficient uniform administration. This hinged largely on having a central body with the power to enforce the laws. There resulted the establishment of a commission, which was made a permanent department of the Government in 1867, and in 1871 became known as the Local Government Board. The board consists of a president appointed by the King and a number of ex-officio members. The president is assisted by two secretaries. The board has power not only to enforce laws, but, on its own initiative, can issue orders and regulations, which may be either general or particular in their application. The board is thus enabled to adapt the system to the varying conditions of different localities, and to the changing conditions in a given place. It can also establish unions and determine the district boundaries between them; and it exercises both an administrative and a financial control over the guardians, and hears and decides complaints brought against them. In order that the board might be properly informed and the charity system properly carried out, assistant commissioners were appointed, who were superseded in 1847 by inspectors. Unreasonable expenditure is carefully guarded against by the creation of auditors, who examine every item of expense and determine whether or not it is in accordance with the law. If they consider it excessive they can disallow it. The function of the overseers (appointed in each parish by the justices) has been greatly reduced from what it was formerly, their relief work (except in cases of sudden and urgent need) being assumed by the guardians and their powers of removal having also been turned over to that body. Practically the only duty left to the overseers is the securing of funds by the poor rate. The guardians have in turn become the most important local officers participating in poor relief.

The unit of administration of the board of guardians is the Poor-Law Union—a combination of parishes. Each parish selects one or more guardians, and these may choose two additional members. In the rural districts the poor law is administered by the district councilors. The board passes upon applications for relief and sees that its decisions are enforced; it has supervision of pauper establishments and the appointment of paid officers subject to the veto of the central board. The most important of the appointed officers are the relieving officer, who investigates and deals immediately with the case at hand, the clerk, who is the secretary of the board, and the assistant overseers and collectors. While the poor rate is levied upon the parish, the cost of relief is defrayed from the common fund of the union. Provision is made for the combination of unions into larger districts for special purposes, as in the case of the maintenance of pauper

institutions. With respect to these institutions the cost is divided between the unions and the larger districts.

Since 1830 the policy pursued has been to limit relief as much as practicable to indoor methods. Asylums, infirmaries, and hospitals are provided for the classes needing such treatment as these institutions afford; schools and training ships for children, and workhouses for the able-bodied. But, in practice, exceptions are made to the rule, and outdoor relief is sometimes given even to the able-bodied, more especially in periods of unusual distress, at which times some sort of public work is likely to be undertaken in order to give the destitute employment. Many paupers have been sent out of the country, but the authorities no longer permit the poor rate to be drawn upon in order to transport paupers to the United States. The majority of pauper lunatics are cared for at the county or borough asylum, but some are kept at the workhouses, and some placed in licensed houses or registered hospitals. In the care of children considerable progress is being made in the operation of the placing-out system.

The experience of Scotland has been much different from that of England, particularly in its lack of continuity. The Scotch Parliament passed laws for poor relief as far back as 1575, but compulsory taxes were not generally collected until the nineteenth century. In the earlier centuries the administration of relief was in the hands first of one body and then of another. Sometimes aid was secured by taxation, but more commonly by offerings of the church sessions and by voluntary contributions. The responsibility of relief was placed upon the parish, but little provision was ever made for the able-bodied poor. The appointment of a committee of inquiry resulted in the passing of an act in 1845 providing a system of poor relief which is still operative.

On January 1, 1901, the paupers actually in receipt of aid, exclusive of vagrants, in England, were 752,182; in Wales, 49,165; in Ireland, 101,090; and in May of the same year the number in Scotland was 99,016. In 1900 the total sum collected by the poor rates in England and Wales amounted to £23,046,814, as compared with £13,033,655 in 1880. But the poor rates are annually supplemented with grants in aid, which in 1900 amounted to £3,261,255. Considerably over one-half is devoted to other purposes than poor relief, such as payments to school boards, rural district councils, county, borough, and police rates and other civic purposes; less than one-half is actually spent in relief of the poor, the amount in 1900 thus spent being £11,567,649, or 7*s.* 3*d.* per head of the population, as compared with £8,015,014, or 6*s.* 4*d.* per head, in 1880. The expenditure in Scotland in 1900 amounted to £1,056,964, and in Ireland to £1,125,110. Throughout Great Britain private charity is very active and is thoroughly organized. A very clearly defined distinction is recognized between the function of the State and that of private charities, and the two coöperate harmoniously. The State only extends its aid in order to alleviate actual distress, without regard to its cause or to the character of the individual, and it does not undertake to prevent poverty. The activities of private charities cover a much wider scope, giving attention to many questions of public welfare, looking toward the prevention and the improvement of conditions that are not necessarily instigated by immediate distress.

Great Britain and Colonies. The developments of the last quarter of the nineteenth century indicate a tendency toward a closer union of the various members of the British Empire. For several years prior to that time the tendency had been rather in the opposite direction, and many persons, both in the mother country and in the colonies, had come to look upon complete separation as the desirable and probable result. But in recent years the idea of a Greater Britain —an Imperial nation—has become popular. The mutual interest existing between the colonies and the mother land is based not only upon their racial and cultural kinship, but upon such practical matters as trade and defense. According to the recent propaganda the mutual welfare of the Empire should not be so completely dependent upon the mere existence of a 'moral federation.' One of the first important steps taken in the movement was the conference held at London in 1884 by the Imperial Federation League. Resolutions were then passed in favor of some form of close and permanent federation. A second important event was the holding of the Colonial Conference at London in 1887, in the proceedings of which the question of levying a small import duty upon foreign goods was given special attention, and treaties made by Great Britain with Germany and Belgium limiting the trade privileges of parts of the Empire were denounced. In 1894 a colonial trade conference was held at Ottawa, Can., and the strengthening of Imperial coöperation was again advocated. The demand was also made that trade should be placed on a more favorable basis than that carried on with foreign countries. The Imperial Federation League was dissolved in 1894, but in the following year the British Empire League was constituted. This organization continues the agitation of the permanent unity of the Empire, and advocates the establishment of periodical conferences for the discussion of the common welfare. The Imperial Federation League of Canada was never dissolved, but became a branch of the British Empire League, under the title of the British Empire League of Canada.

On the occasion of Queen Victoria's Jubilee in 1897 the common welfare of the colonies was informally discussed by the premiers of the self-governing colonies. An offer of aid to the British navy was made then by Cape Colony and Australia, an offer of preferential trade duties by Canada, and the above-mentioned treaties were again denounced. Mr. Chamberlain suggested at that time the creation of a Council of Empire, which might slowly grow into a Federal Council; but the resolutions passed admitted that "the present political relations between the United Kingdom and the self-governing colonies are generally satisfactory under the existing condition of things," but that "it would be desirable to hold periodic conferences of representatives of the colonies and Great Britain for the discussion of matters of common interest." The concern manifested by the colonies in British success in the South African War, and their coöperation to that end, aroused much enthusiasm in favor of a more definite Imperial union; but the meeting of the premiers on the occasion of the King's

coronation in 1902 did not appear to result in any advance ground being taken. The colonies are loath to burden themselves with the additional taxation, or to surrender any measure of their independence which would result from their entrance to the British *Kriegsverein* (War Union); and Great Britain, on her part, is not ready to establish preferential import duties in favor of the colonies. The question of universal Imperial free trade as a basis of union seems to be altogether beyond the range of practicability. Canada is willing to make concessions, and indeed, in 1897, immediately upon the termination of the above-mentioned British treaties with Germany and Belgium, a preferential tariff of 25 per cent. went into effect in Canada. It was increased in 1900 to 33 per cent. Australia, on the contrary, seems to be further removed than ever from any probable trade concessions. However, steps are being taken, such as the establishment and improvement of steamship lines, the construction of cables, and the introduction of the penny postal system, which are calculated to foster in a practical way the relations between the members of the Empire. For a statement of the varying methods of the Government prevailing in the colonies, see the article BRITISH EMPIRE, and the articles on the different colonies. See *Defense* in this article; also the general article on NAVIES.

GOVERNMENT. The present government of the British Empire is the result of a long process of historical growth. Its Constitution is more largely unwritten than that of any other country of Western Europe, and what is written is not contained in a single instrument, but is scattered through various acts of Parliament and solemn agreements extending from the Middle Ages to the present time. That part which is unwritten consists of customs, maxims, and institutions which, by virtue of the acquiescence of the nation through a long period of time, have come to have the force of written law. The British Constitution is not, therefore, the product of revolution to the same extent that most of the Continental constitutions of Government are revolutionary products, that is, it is not the artificial creation of a single constituent body organized for the purpose of embodying in legal institutions the results of a violent and bloody revolution. And yet the steps by which the Constitution has reached its present development have been from the legal point of view, at least, revolutionary. As an example of this may be cited the extraordinary, if not revolutionary, methods by which the Reform Bill of 1832 was carried, as a result of which the position of the House of Commons as the final repository of the nation's sovereignty was definitely settled, and the House of Lords retired into the background, stripped of its right to share with the Commons the custodianship of the national sovereignty. Henceforth the House of Lords has been an organ of Government merely, its chief function being equal participation in the legislative power. In addition to this position, the House of Commons is a perpetual constituent assembly for revising the Constitution. Theoretically, the House of Lords shares this power equally with the Commons, since constitutional amendments are passed like ordinary statutes; but the events of 1832 settled the question of the supremacy of the Commons in the domain of constitution-making, and whenever they insist upon a change in the organic law, especially if the electorate has pronounced upon it favorably, the Lords must consent to it. If, however, they refuse, the effective resource of the Commons is to have the Crown pack the House of Lords with new members who are in favor of it. The aversion of the Lords to having their ranks recruited by appointees of the Government created to carry out its will is assurance that resort to such a method will scarcely be necessary. Such in brief is the general character of the English Constitution. It vests the legislative power in a bicameral Parliament with substantial equality of powers in legislation except that revenue and appropriation bills originate in the Lower House.

The House of Commons at present consists of 670 members, of which England chooses 495, Scotland 72, and Ireland 103, and they are elected by secret ballot for a term of seven years. The House of Commons proceeds from an electorate defined by a series of statutes passed during the course of the nineteenth century, the last and most comprehensive of which bears the date of 1884. According to these acts, the voter in an English county or borough must be a male citizen twenty-one years of age, a freeholder of the annual value of 40s., or a copyholder or leaseholder of the annual value of £5. But if he has no such interest in real estate, he must be a householder of the annual value of £10, or a lodger of the same value. In Scotch and Irish counties the qualifications are substantially the same. There is, therefore, a uniform household and lodger franchise throughout the Kingdom. Besides the qualifications required, there are a number of disqualifications, the more important of which relate to the holding of certain incompatible offices at the same time, conviction of certain crimes, and receipt of poor relief. Voters who possess the requisite amount of property in different districts are entitled to a vote in each district. The members are distributed according to population, and are chosen by districts and on single ticket. The Redistribution Act of 1885 provides for the creation of election districts containing approximately 54,000 inhabitants, and enacts that each district shall send one representative. An exception to this principle is the provision which allows towns with a population of more than 15,000, but less than 50,000, to send one member, and towns with a population of more than 50,000, but less than 165,000, to choose two members, and which allows several of the universities to send two members, although they have small constituencies. To be eligible to a seat in the House of Commons the candidate must be a male citizen not under twenty-one years of age. Disqualified are English and Scotch peers, representative Irish peers, Roman Catholic priests, clergymen of the Established Church, judges, sheriffs, and other returning officers, Government contractors, bankrupts, and persons convicted of certain crimes.

The House of Lords consists (1) of 496 English hereditary peers whose ancestors received a royal summons to sit in the Parliament since 1295, or who have themselves received a patent of nobility in the United Kingdom; (2) sixteen Scotch representative peers chosen for the term of Parliament by a majority of all the Scotch peers, i.e. those whose ancestors sat in the Scotch House

of Lords before the union; (3) twenty-eight Irish peers chosen for life by the whole body of Irish peers; (4) two archbishops and twenty-four bishops by virtue of their office; and (5) four judicial members, known as Lords of Appeal in Ordinary, appointed by the Crown for life. It will thus be seen that the means of recruiting the House of Lords are four in number, viz.: Inheritance, election, ecclesiastical office, and royal appointment. There is no limitation upon the power of the Crown to create English hereditary peers, as there is in the case of life peers and of Scotch and Irish peers. The only qualification for membership in the House of Lords is male sex, citizenship, and attainment of the age of twenty-one years, while bankruptcy and conviction of felonious crime disquality.

The members of both Houses are privileged from arrest except for indictable offenses, the Commons for the period of the session, and forty days before and after, the Lords at all times. They cannot be questioned outside of Parliament for opinions expressed or votes cast in that body; but the courts have held (Stockdale and Hansard) that if the Commons have their speeches published and circulated they are amenable to the law of libel and slander as private individuals are. Members of neither House receive pay for their services, although an occasional constituency undertakes to pay its member a salary, as has recently happened in the case of some of the Irish members.

Parliament is required to assemble at least once in three years. As a matter of fact, it usually meets annually, in February, and remains in session until the middle of the summer. It is summoned, opened, and prorogued by the Crown, upon the advice of the Prime Minister. It is dissolved either by the legal expiration of the term of the Commons or by order of the Crown, with the advice of the Ministry. As no Parliament has ever lasted through its full term of seven years, dissolution has always resulted from the action of the Crown. Dissolution puts an end to the existence of the House of Commons without affecting the Lords, except the Scotch peers who are elected for the term of Parliament, while prorogation terminates the session merely. Formerly, the death of the sovereign caused the dissolution of Parliament, but that custom has recently been abolished by statute. Either House may adjourn for short periods of time independently of the other or of the Crown. The internal organization of Parliament is left partly to the action of each House. Thus the Commons choose their own Speaker, although by custom the presiding officer in the House of Lords is the Lord Chancellor, a member of the Ministry. Inasmuch as he may, therefore, be a member of the House of Commons, his seat is placed without the limits of the chamber in which the Lords hold their sessions. The other officers of Parliament are appointed by the Crown. Over its discipline and rules of procedure each House has full control, and in pursuance thereof may expel a member or punish an outsider for contempt. A quorum necessary for doing business is fixed at forty in the House of Commons, and three in the House of Lords. When we come to discuss the powers of the English Parliament, it is only necessary to say that the Constitution places no legal limitations upon its power. It is, therefore, omnipotent so far as its legal powers are concerned. The sovereignty of Parliament, says Dicey, is its dominant characteristic. Its power, however, is a present one, and cannot bind future Parliaments. In the exercise of legislative power the Houses of Parliament are, theoretically, equal except in the initiation of financial measures; but, practically, the House of Lords occupies a subordinate position, since it cannot long refuse its assent to a measure sent it by the Commons unless there is doubt as to the will of the people regarding it. The House of Lords also acts as the highest court of appeal for the United Kingdom. See the article PARLIAMENT.

The executive power is, nominally at least, in the Crown, which possesses the attributes of irresponsibility, immaculateness, and immortality. It is hereditary, according to lineal primogenial descent, with preference for males over females among brothers and sisters. The statutes require that the wearer of the crown shall not be a Papist, but shall be a communicant of the Established Church, while custom would seem to require that the ruler shall have attained the age of eighteen before exercising the royal powers. Besides executing the will of Parliament and of the courts, the Crown may do anything which it is not forbidden by Parliament to do. Formerly it had a wide legislative and judicial power, but in the course of the struggle between King and Parliament, most of its powers in these domains have been withdrawn. At the present time the powers of the Crown include the declaration of war; the negotiation of treaties; the appointment and reception of diplomatic officers; the issuance of passports; the command of the army and navy, with a large power over the appointment, promotion, and dismissal of officers, and the promulgation of rules for the government and disposition of the forces; the appointment of all the civil officers of the Government, and the removal of most of them; the appointment of the high clerical officers of the Established Church, and full power of control over the ecclesiastical Parliament or Convocation; and the granting of pardons. The power of the Crown in legislation has already been discussed in connection with the subject of Parliament. There might be added to the list the right of the Crown to veto all legislative measures passed by the Parliament. This right, however, has not been exercised since 1707, and the adoption of the Cabinet system of responsible government will make further resort to it by the Crown unnecessary. Most of the powers enumerated above have not been expressly conferred on the Crown by statute, but constitute what may be called its residuary powers.

As already stated, the position of the Crown is one of irresponsibility. It therefore exercises its powers through a responsible Ministry selected from among the members of Parliament, and belonging to the political party which has a majority in the House of Commons. They are at the same time the heads of the executive departments and members of the Privy Council. When a Cabinet is to be formed, the King sends for the acknowledged leader of the majority party in the House of Commons, asks him to accept the Premiership, and intrusts him with the selection of his colleagues. If the leader so recognized thinks his party will support him, he at once undertakes the formation of the Cabi-

net by consulting with other prominent leaders of his party, and finally sends to the sovereign the names of those whom he wishes appointed to assist him in the conduct of the Government. They are promptly appointed and commissioned. They may be members of either House, but members of the House of Commons who receive appointments as Ministers must resign their seats and secure the approval of their constituents by a reëlection—an approval which is rarely withheld. The Cabinet, strangely enough, is an extra-legal institution, its existence having never been recognized by act of Parliament; the names of the members are never officially announced to the public; and no record is kept of its meetings or acts. The size of the Cabinet varies according to the prominence which certain interests are likely to assume in the Parliament. At the present time there are nineteen members. They are: the First Lord of the Treasury, the Lord Chancellor, the Lord President of the Council, the Lord Privy Seal, the Chancellor of the Exchequer, the Secretaries of State for Home Affairs, for Foreign Affairs, for the Colonies, for India, and for War, the First Lord of the Admiralty, the President of the Local Government Board, the President of the Board of Trade, the Lord Lieutenant of Ireland, the Lord Chancellor of Ireland, the Secretary for Scotland, the First Commissioner of Works, the President of the Board of Agriculture, and the Chancellor of the Duchy of Lancaster. The first eleven Ministers always have seats in the Cabinet. The legislative duties of the Cabinet are to urge the adoption of measures of the Government in the House of Commons, and to defend the Government's policy against attack from the opposition, and for that purpose the members have seats in the House. It initiates the public legislative measures, and assumes the leadership in the debates in support of the views of the majority. The Ministers are responsible to the House of Commons for their policy, and if they are defeated on any important measure, or if the House votes lack of confidence in them, they resign, and another Ministry is formed from the new majority. If, however, the defeated Cabinet think they still represent the will of the people, they can ask the King to dissolve the House of Commons and order a new election. If the electorate pronounces against them, they must resign. Their responsibility is collective, and therefore they all go out together unless the conduct of a particular Minister has been such that the responsibility for the objectionable policy may be fixed on him, in which event he alone resigns. This happened in 1851 in the case of Lord Palmerston, the Foreign Secretary, who was forced to resign.

In addition to their legislative functions, the Ministers act as heads of the various departments of administration. The Prime Minister usually takes the portfolio of the Treasury Department with the title of First Lord of the Treasury, although at the present time he occupies the post of Foreign Secretary. There are few duties, however, attached to the First Lordship of the Treasury, the actual head being the Chancellor of the Exchequer, who is the chief financial officer of the Government. He prepares annually and submits to Parliament the budget or statement of the estimated receipts and expenditures of the Government for the ensuing year, together with suggestions for the increase or reduction of taxation in case of expected deficit or surplus. Both of these offices were held at the same time by Mr. Gladstone while Prime Minister. The duties of the Secretaries of the Foreign Office, the Colonial Office, the War Office, and the India Office are sufficiently clear from the names. The Secretary of State for Home Affairs supervises the police and certain local administration, advises the sovereign in the matter of granting pardons, and has certain duties in connection with labor legislation. The Admiralty attends to the administration of naval affairs, and is under the control of six lords. The duties of the Board of Trade relate to the Government supervision of commercial, railway, marine, and statistical affairs, coinage, weights and measures, and the post office.

When we turn to the judicial system we find only two tribunals which are in any sense constitutional courts. These are the House of Lords and the Judicial Committee of the Privy Council. The House of Lords acts as a criminal court for the trial of peers, as a general court of impeachment, and as the highest court of appeal for the Kingdom. In the last-mentioned capacity only the Lord Chancellor, who presides, the Lords of Appeal in Ordinary (four life lords of high judicial standing recently provided for by statute), and such members as have formerly held high judicial office, take part in the hearing. The jurisdiction of this court extends to the hearing of cases appealed from any appellate court in England, or from any court in Scotland or Ireland, from which appeals were allowed to the House of Lords previous to 1876. The Judicial Committee of the Privy Council is a court of last resort for India, the colonies, the Isle of Man, the Channel Islands, and the vice-admiralty courts abroad. Its personnel is substantially the same as that of the House of Lords when sitting as highest court of appeal. Apart from these tribunals the general courts of the Kingdom are the High Court of Justice and the Court of Appeal. The former consists of three sections, known as the Chancery Division, of six judges, the King's Bench Division, of fifteen judges, and the Probate, Divorce, and Admiralty Division, of two judges. Appeals lie from this court to the Court of Appeal, a tribunal consisting of the Master of the Rolls, five justices, and the three presidents of the divisions of the High Court. The principal criminal courts are the petty sessions and quarter sessions, held by the justices of the peace; the assize courts, held four times a year in certain towns, usually by judges of the King's Bench Division; and the Central Criminal Court, which is the court of oyer and terminer and jail delivery for the city of London and surrounding territory.

The system of local government in England is one of great complexity, and, therefore, difficult of explanation. Until recently it was a patchwork without symmetry or logical consistency. The recent Parliamentary acts of 1888 and 1894 have done something toward simplifying the system, but it still possesses elements of confusion and lack of consistency. As a result of recent legislation the more important local units are counties, boroughs, urban districts, rural districts, parishes, and school districts. The chief county officers are the Lord Lieutenant, the Sheriff, the Justices of the Peace, the Clerk, and the Coroner. The Lord Lieutenant is the repre-

sentative of the Crown in the county, and the keeper of the records. The Sheriff, who formerly wielded vast powers, is now a ministerial officer whose chief duties relate to the enforcement of the judgments of the courts and the holding of Parliamentary elections. The Justices of the Peace, until 1888 the most important local officers in the English system, were stripped of most of their large administrative and financial powers by the Local Government Act of that year, and are now chiefly judicial functionaries. They are appointed by the Lord Chancellor upon the nomination of the Lord Lieutenant of the county in which they reside. Their jurisdiction extends to the preliminary investigation of all crimes. Acting individually or in petty or special sessions, they try minor offenses without a jury. As a criminal court of first instance all the justices of the county sit together in a court of quarter sessions, and without a jury they constitute a court of appeal from the orders and decisions of the justices acting individually or in petty or special sessions. They still retain some administrative duties, such as issuing licenses for the sale of liquor, appointing overseers of the poor, and assisting in the administration of the police. By the act of 1888 there was created in each of the sixty-one administrative counties into which England, with Wales, is divided (except London) a popularly elected County Council consisting of councilors and aldermen, the latter being selected by the councilors, usually from their own body. The term of the councilors is three years; that of the aldermen six years, one-half their number retiring every third year. They all sit together under the presidency of a County Chairman, chosen from the aldermen; and he alone receives compensation. The powers and duties of the County Council extend (1) to the care and administration of the county property; (2) to the selection and supervision of most of the minor county officers; (3) to the assessment of rates and raising of loans; (4) to the management of highways; (5) to the granting of licenses for maintaining music and dancing houses; (6) to the control of the police (except in London) through a committee of the council, on which an equal number of justices of the peace have a place; and (7) to a variety of other matters of local concern. It will be seen that, like the similar county authority in the United States, the County Council is an authority of enumerated powers, and may do nothing which Parliament has not authorized it to do.

Below the county is the 'district,' which may be either rural or urban. The act of 1894 provided that each 'rural district' should consist of a group of rural parishes, and its chief organ should be a council elected for a term of three years by the parish assembly, and which should be vested with the administration of the poor law, the public health, and the highway acts. The 'urban district' consists of a group of urban parishes in unincorporated boroughs, and, like the rural district, has a council with the same powers, except that it is not charged with the poor-law administration, that being left to a board of guardians. Below the 'district' is the parish, the usual distinction between those which are urban and those which are rural still being observed. The act of 1894 reorganized the government of the rural parishes, but scarcely affected the urban parishes. According to that act every rural parish with a population not exceeding three hundred has a parish meeting, or assembly, at which every elector, including married women, has the right to be present and vote. Rural parishes with a population exceeding three hundred have in addition a parish council of from five to fifteen members, elected for one year. The councils have taken over the civil powers of the old vestries, which since 1894 have been ecclesiastical bodies merely, and in addition perform a series of duties relating to charities, water-supply, public health, highways, and other matters. The parish meetings elect councilors, approve loans, and vote upon certain permissive acts of Parliament which relate chiefly to the establishment of public libraries, baths, washhouses, electric-light plants, etc.

Incorporated towns, including 'county boroughs' (i.e. boroughs which are treated somewhat as a county) are governed through a mayor, aldermen, and councilors, which together constitute a municipal corporation, and which is known as the 'council.' The councilors are elected practically by the rate-payers of the borough for a term of three years, one-third retiring annually; the aldermen are elected by the council for a term of six years, one-half retiring every third year; and the mayor is elected by the council for one year. He alone is a salaried officer, and is an ex-officio justice of the peace. The municipal corporation is an authority of enumerated powers. They include substantially the same powers as the urban council, but provision is made by which the borough may have a separate commission of the peace, i.e. additional justices of the peace or a separate quarter session, and its own police force.

The metropolis of London, by the Local Government Act of 1888, was erected into an administrative county with its own council, its own sheriff, and other officers. By a recent act which went into effect in 1901, the county of London, including the city, was divided into 29 boroughs, each with its mayor, aldermen, and councilors, which take the place of the old parish vestries, formerly the chief local governing bodies of the metropolis.

The recent Parliamentary legislation has shown a marked tendency in the direction of establishing greater central control over the local administration. The chief organ of supervision is the Local Government Board, created in 1871, the president of which is usually a member of the Cabinet. It has the power to approve or disapprove many acts of the local organs, to audit the accounts of the local authorities, to compel them to take action in certain particulars, and has considerable disciplinary power over the local civil service.

SCOTLAND. The government of Scotland, since the union with England in 1707, has been a part of the general administration of Great Britain. Until 1885 the connection was maintained chiefly through the Home Office. In that year the office of Chief Secretary for Scotland was created, and a variety of duties which had previously been discharged by different departments were transferred to the new office. The Chief Secretary is a member of the Cabinet, and as such is the chief spokesman of the Ministers in the House of Commons in regard to business pertaining to Scottish affairs. Another important functionary in the government of Scotland is the Lord Advocate,

who acts as chief law officer of the Crown for Scotland, and is the legal adviser of the Crown in Scottish affairs. As such, he serves as Attorney-General and public prosecutor for Scotland and has control of the whole criminal business of that country. He also has charge of the preparation for the consideration of Parliament of all bills affecting Scottish affairs. The Lord Advocate is assisted by a Solicitor General for Scotland, whose duties resemble those of the similar officer for England. The local government of Scotland is regulated chiefly by the recent Scottish Local Government Acts of 1889 and 1894. By the former act an elective county council was created in each county, following the English Local Government Act of the previous year. These councils are in all respects similar to those provided for English counties. They took over most of the duties of the old county boards, the chief of which was the Commission of Supply. The Local Government Act (Scotland) of 1894, following the similar act passed the same year for the local government of England, provided for an elective parish council in each parish to take the place of the old parochial boards and to exercise substantially the same powers as the English parish councils. By the same act a local government board for Scotland was created. It consists of the Secretary for Scotland as president, the Solicitor-General, the Under-Secretary for Scotland, and three other members appointed by the Crown. Municipal administration in Scotland does not differ greatly from that of England. There are several kinds of burghs, some of which have a little more local autonomy than others. The municipal officer corresponding to the English alderman is known in Scotland as the baillie, while the one corresponding to the English mayor goes by the name of provost.

For the administration of justice in Scotland there is a Court of Sessions, corresponding to the Supreme Court of Judicature in England. It is the highest civil tribunal in Scotland, consists of thirteen judges, and is divided into chambers and subdivided into divisions for the dispatch of business. The Supreme Criminal Court for Scotland is the High Court of Justiciary, consisting of all the judges of the Court of Sessions. It sits part of the time in Edinburgh and part of the time goes on circuit. Circuits are held twice a year, for which purpose Scotland is divided into three districts. For the trial of criminal cases, usually one judge with a jury of fifteen men constitutes the court. The High Court has exclusive jurisdiction in cases of treason, murder, robbery, rape, and in general all the more serious offenses. The more important inferior courts of Scotland are those held by the county sheriffs, who are appointees of the Crown, for a good-behavior tenure. They have a civil and criminal jurisdiction somewhat similar to that exercised by the County Courts and Courts of Quarter Sessions in England, and cases tried by them with a jury cannot be reviewed by the higher courts. For the government of Ireland, see IRELAND.

HISTORY.

DEVELOPMENT OF CABINET GOVERNMENT, 1688-1760. The legislative union of England and Scotland was formally consummated on May 1, 1707. There had been much opposition to the union in Scotland on account of the unwillingness of the English Parliament to grant a trade union with equality of commercial privileges; but the threatening measures of the Scotch Parliament looking toward an absolute separation overcame this unwillingness, and Scotland was received as an equal in all respects, with a proportional representation in both Houses of the new British Parliament. Ireland was less fortunate. The Protestant Parliament there, in direct violation of the Treaty of Limerick, made the position of the Catholic population, which was the great majority, almost intolerable. The English Parliament, by forbidding the import of Irish meat and cattle into England, and the export of Irish woolen goods to any country other than England in 1699, effectually destroyed Irish trade. During the latter part of the reign of Anne the Tories, under the leadership of Harley (Earl of Oxford) and Saint John (Earl of Bolingbroke), ruled the country, their ascendency being due in some measure to Mrs. Masham, who had superseded the Duchess of Marlborough as the Queen's favorite. The Tories did all they could to preclude their opponents from the possibility of future success. The Occasional Conformity Act and the Schism Act further disqualified Dissenters from voting or holding office. The creation of twelve new peers in 1711 gave the Tories a majority in the Lords, and was a most important constitutional measure, since it demonstrated that in case of disagreement between the two Houses the Commons could always prevail by the creation of the requisite number of peers to constitute a majority. Harley and Saint John even contemplated the restoration of the House of Stuart in order to prevent the Whigs from ever returning to power; but their plans were thwarted by the sudden death of the Queen in 1714. The Treaty of Utrecht, which terminated the War of the Spanish Succession, gave Gibraltar and Acadia to England, together with Minorca, which was finally restored to Spain in 1783.

With the accession of the House of Hanover (or of Brunswick), in the person of George I., came a long supremacy of the Whig Party, which was a combination of the great landed aristocracy with the industrial classes of the towns, while the strength of the Tories consisted in the support of the country gentry. The Whigs derived their strength from the boroughs, the more important of which numbered Dissenters among their industrial population, while the 'pocket boroughs,' often inconsiderable hamlets, were either directly under the control of the neighboring magnates, usually Whigs, or else purchasable by them. These magnates were wealthier and more enlightened, and so better qualified to govern Great Britain at this time than the Tory squires, whose chief doctrine was aversion to Dissenters and the rising English industries. As the Tories favored the House of Stuart, the first Georges were compelled to choose their Ministers from the Whigs. They were more interested in their German than in their English possessions, and as long as they were supported by England in their Continental designs they were quite willing to allow the English Ministry to do as it pleased in regard to home affairs. The Cabinet ceased to hold sessions in the King's presence, and by degrees his place as head of the council came to be filled by one of its members. This member was usually the guiding spirit of the Cabinet. He chose the Ministry and distributed the royal patronage.

He and his Ministry were responsible to Parliament alone.

The first act of the Whig Parliament of 1715 was the impeachment of Tory leaders for treasonable correspondence with the exiled House of Stuart. Oxford was sent to prison, Bolingbroke and Ormond fled to France. The badly led rebellion of 1715, in favor of James Edward Stuart, the son of James II., in Scotland and Northern England, was easily suppressed. In 1716 the same Parliament prolonged its power by an act of providing for septennial Parliaments, and in 1718 it provided relief for the Dissenters by the repeal of the Occasional Conformity Act and the Schism Act. In 1720 a mad wave of speculation in shares of the South Sea Company swept over the country, based on exaggerated notions of the value of the trade with the Spanish colonies in South America. The majority of the Ministry were involved in the affairs of the Company, and when the bubble burst they were forced to resign. A partial relief for the sufferers was provided by the able Administration of Sir Robert Walpole, who was the virtual head of the new Cabinet. For twenty-one years this astute man was the guiding spirit in English politics. He brought to the country the quiet it needed, and by his prudent measures reconciled it to the results of the revolution of 1688. He avoided exciting popular feeling, even withdrawing measures of undoubted excellence, because of the prejudice against them; as, for instance, his Excise Bill in 1733, which provided for the regulation of import duties in Government warehouses. With great reluctance, he permitted the popular feeling in 1739 to involve the nation in the unjust Spanish War, but resigned in 1742 rather than embark in a second war, that of the Austrian Succession. In his previous peace policy he had had the support of the nation, although he had never hesitated to maintain his majorities by making use of the most unblushing corruption. Carteret was the actual head of the next Ministry, a short-lived one. His participation in the War of the Austrian Succession was indeed fortunate for Hanover, but brought neither glory nor profit to England. During this war occurred the daring invasion of the Young Pretender, Charles Edward Stuart. At the head of the Highland clans he gained a brilliant victory over the royal forces at Prestonpans in 1745, and advanced into England as far as Derby, but was finally forced to withdraw to Scotland, and was overthrown at Culloden in 1746. In 1745 began the struggle between England and France for dominion in India.

After Carteret had been compelled to resign and the great Whig family of Pelham had shown its incapacity, and the Duke of Newcastle had demonstrated his incompetence to rule, Pitt entered the Cabinet in 1756. From this time until the day of his death he remained the most prominent figure in English politics. Although nominally a Whig, he was in reality above party ties, and his political code was at least honest. The middle class trusted him and formed his strongest support. He was hostile to France, and took active part with Frederick the Great in the Seven Years' War, in which the French were deprived of Canada, which became English, and of Louisiana, as well as of their power in India. He resigned in 1761 because the Cabinet refused to follow him in the declaration of war with Spain, which he considered inevitable. In the course of the Seven Years' War, and the ensuing years, Clive laid the foundation of a great British empire in India.

THE STRUGGLE AGAINST DEMOCRACY, 1760-1820. Meanwhile in 1760 George III. had ascended the throne, with the fixed design of restoring, as far as practicable, the royal prerogatives which his two predecessors had allowed to slip from their grasp. He was determined to break up the party system as it then existed, to destroy the Whig oligarchy, and, by selecting his own Ministers, exert a determining influence in English politics. Resuming the royal patronage, he had soon formed a party of adherents, the 'King's friends,' who looked to him for political guidance. Availing himself of dissensions within the Whig Party, he forced Lord Bute, his favorite, into the Cabinet as Prime Minister, but the latter showed incapacity and had to resign. At last the King found in Lord North a Minister through whom he could carry out his ideas. Under the North Ministry the American War of the Revolution broke out, and England lost her most valuable colonies. With the greatest reluctance the King allowed the Rockingham Ministry, with Fox as its leading spirit, to be formed. He was opposed to Fox's grant of legislative independence to Ireland, and the actions of Shelburne, backed by the King's influence, caused the disruption of the Ministry before the completion of the negotiations of the Treaty of Paris, 1783, conferring independence upon America. By his personal influence again the King overthrew the coalition Ministry of Fox and North, and in the face of a hostile majority appointed the younger Pitt Prime Minister.

Although the King did not always approve Pitt's measures, they were agreed in the general policy to be pursued. Pitt's India Bill in 1784 reduced the power of the East India Company by submitting its political measures to the control of a commission named by the King. Pitt endeavored to do further justice to India by assisting the Whigs, under the leadership of Fox, Burke, and Sheridan, in the prosecution of Warren Hastings. Although at first he was not in favor of the war against the French Republic, he soon became its principal advocate. He was joined by a majority of the Whigs, the most influential of whom was Burke. Fox, however, remained his opponent, arguing that the demands of the democracy should be met by reforms at home. The revolt in Ireland, in connection with this war, resulted in the Act of Union in 1800; but Pitt was compelled to resign because the King was unwilling to sanction Catholic emancipation in that country, which was one of the terms upon which Pitt proposed the union. He soon resumed power, however, and the war against Napoleon was prosecuted vigorously and with success. Nelson conquered at Trafalgar and Wellington drove the French out of Spain. The Congress of Vienna allowed England to retain a large part of the territories (Cape Colony, Ceylon, British Guiana), gave her Mauritius, Tobago, and Saint Lucia, and confirmed her in the possession of Malta, which she had wrested from the Dutch in the course of the French wars. But while the war against Napoleon, simultaneously with which a less successful conflict was waged with the United States (1812-15), confirmed the naval supremacy of England, it entailed upon the country an enormous debt, and greatly retarded the

economic and political reforms which the times demanded. During the years that followed Waterloo new corn laws were enacted, and the sternest measures were taken to suppress the rising democracy. In 1817 the Habeas Corpus Act was suspended, in 1819 occurred the Manchester Massacre, and the notorious Six Acts, by which radical meetings were suppressed, were enacted. In 1820 George IV., who had been appointed Regent for his insane father in 1811, ascended the throne.

Democracy and Reform, 1820 till the Present Time. With the accession of Canning to the Foreign Office in 1822, England again entered upon a more liberal policy by opposing the Holy Alliance between Russia, Austria, and Prussia for the suppression of democracy. In 1824 she acknowledged the independence of the Spanish colonies. Assistance was afforded to the Greek patriots in their uprising against Turkey in 1827. In 1823, under Sir Robert Peel, an enlightened Tory, the criminal law was radically reformed by the abolition of the death penalty for some two hundred crimes, most of which were trivial offenses.

The combination laws, which prohibited any workingmen's associations, were repealed in 1825, thus paving the way for the trades unions that followed. In 1823 and again in 1825 the import duties were materially reduced. Both of these measures were brought about through the instrumentality of John Huskisson, President of the Board of Trade.

During its long exclusion from office the Whig Party had changed from the close oligarchy of the eighteenth century, and had become the advocate of democratic reforms. Lord John Russell, its most energetic leader, waged a long struggle in Parliament for liberal measures, and it was largely owing to his efforts that the Corporation Act and the Test Act were repealed in 1828 by a Tory Ministry, headed by the Duke of Wellington. In 1829, in consequence of the O'Connell agitation for the separation of Ireland from Great Britain, Catholic emancipation was granted. At length, in 1830, a few months after the accession of William IV., the Whigs, by a fusion with the more advanced Conservatives (Canningites), returned to power with Earl Grey as Premier. His Ministry was celebrated for the number of reforms it introduced. In 1831 Lord John Russell introduced the first Reform Bill in the House of Commons, which, after an appeal to the country, was indorsed by an overwhelming majority, and, notwithstanding the opposition of the Lords, became a law in 1832. In its final form this law took away the franchises of forty-one boroughs and deprived thirty others of one member each, distributing this representation among the larger towns and more populous counties. By these measures it transferred the balance of political power to the middle classes of the towns.

In the next election the Ministerialists received an overwhelming majority. This majority was composed of two groups, the Radicals and the Whigs, who assumed the common name of Liberals. A number of important reforms were introduced. The number of bishops of the Established Church of Ireland was reduced from twenty-two to twelve, and certain ecclesiastical taxation was levied on the clergy, instead of being levied on the population at large. In 1833 slavery was abolished in the colonies, and a compensation of £20,000,000 was given to slave-owners. In the same year the first Factory Act, limiting the labor of children to eight hours a day, was passed through the efforts of Lord Ashley, and in 1834 the new Poor Law, abolishing outdoor relief and charity to the able-bodied, was enacted. The Liberal Ministry of Lord Melbourne, which came to power in 1835, also enacted a Municipal Corporations Act providing for the election of corporations by the ratepayers, in place of the old method of self-election. In 1837 a rebellion in Canada gave occasion for uniting the provinces of Upper and Lower Canada into one Dominion. In 1838 a new Poor Law was enacted for Ireland, and a Tithe Act was passed, levying the tithes on the landlord instead of on the tenants. During this reform period the foreign policy, which was directed by the brilliant Lord Palmerston, was an alliance with constitutional France against the absolute governments of Prussia, Austria, and Russia. His support of the Sultan of Turkey against Egypt, however, brought about an estrangement with France.

Since the regency of George IV. the monarchs of England have exerted little influence on the government of the country. Neither George IV. (1820-30) nor William IV. (1830-37) was a man of ability, and Queen Victoria (1837-1901) was wise enough never to interfere in political affairs. Her husband, Prince Albert of Saxe-Coburg (married in 1840), gained great popularity, not only because of his chivalry to his wife, but because of the tactful manner in which he understood his constitutional position. He did much to further culture and art in Great Britain, and his death in 1861 was much regretted. With the accession of Queen Victoria the crown of Hanover became detached from that of England.

In 1841 the new Conservative Party came to power under Sir Robert Peel. It was composed of the Tories and of the more conservative Whigs under the leadership of Lord Stanley, afterwards the Earl of Derby, who had left the Liberal Party. By anticipating the plans of the Liberals the Conservatives sought to make reforms, but in accordance with their own principles. In 1842 and 1845 Peel further reduced the protective tariffs, providing an income tax to meet the ensuing deficiency in the revenue. The conditions of women and children employed in the mines were improved by the efforts of Lord Ashley in Parliament. In consequence of the agitation against the corn laws, headed by Richard Cobden and John Bright, and under the stress of the Irish famine, Peel went so far as entirely to repeal the import duties on corn in 1846. In this measure he was supported by the Liberals, but opposed by the majority of his own party, which represented the land interests. He was consequently overthrown; but the Liberal Ministry of Lord John Russell, which followed, introduced no measures of importance, either to relieve the tenant farmers in Ireland or to enlarge the suffrage in accordance with the demands of the Chartists in England. The foreign policy of all reform Ministries had been one of hostility to Russia. The invasion of Afghanistan in 1839, intended as a measure against Russian aggression, resulted in the disastrous retreat from Kabul and the annihilation of a British army in 1842—a humiliation in a measure retrieved by the subsequent successes of the British. England's alli-

ance with France in the Crimean War (1854-56), by which Russian aggression against Turkey was checked, was actuated by the same motives. The leading statesman identified with this aggressive policy was Lord Palmerston. In the early part of the reign of Victoria the British Empire in India expanded with giant strides, Sindh, the Punjab, and Oudh being annexed between 1843 and 1846. The so-called Opium War with China (1840-42) gave Hong Kong to England. In 1857 occurred the terrible mutiny of the Indian Sepoys, the native troops in British employ. On the suppression of the mutiny, Parliament put an end to the authority of the East India Company by making India a Crown colony. Its Governor-General (henceforth Viceroy) was brought directly under the British monarch.

During the third Derby Ministry, Disraeli, its real leader, carried the Second Reform Act, by the aid of the Liberals, in 1867. This act established practical household suffrage in the towns, thus giving to the workingmen a voice in political affairs, and greatly enlarged the suffrage in the country. The first Ministry of Gladstone, which followed (1868-74), resembled the Ministry of Earl Grey in the number of reforms it inaugurated. The attempted Irish revolutions of 1848 and 1867 (see FENIAN SOCIETY) had convinced Mr. Gladstone of the necessity of the redress of Irish grievances. In 1869-71 the Irish Church was disestablished and disendowed. A Land Act in 1870 compelled landlords to compensate tenants for improvements in cases of eviction, and provided for Government loans to tenants wishing to buy their holdings. Forster's Education Act provided for national primary schools and for compulsory attendance, in place of the public aid which had previously been given to private institutions. The purchase of positions in the army was abolished in 1871, and the Ballot Act of 1872 instituted secret voting at elections. Gladstone's foreign policy was one of non-interference in European wars and justice to the neighbors of the colonies. He settled the *Alabama* Claims by the payment of $15,000,000 to the United States, in accordance with the decision of a court of arbitration which sat at Geneva in 1871.

The second Ministry of Disraeli (1874-80), on the other hand, was noted chiefly for its aggressive foreign policy. He had Queen Victoria proclaimed Empress of India in 1877. His interference robbed Russia of the fruits of her victory over Turkey in 1878, and secured Cyprus for England, and in the same year he made war upon Afghanistan, whose sovereign was leaning toward Russia. In Africa a controlling interest in the Suez Canal was acquired, the Transvaal was annexed (soon, however, to be set free), and the Zulus were subdued. In his second Ministry (1880-85) Gladstone also was compelled to extend the Empire by suppressing the revolt of the native Egyptians under Arabi Pasha against the dual control of the finances of Egypt by France and England. As a result of this war Egypt came under British control. Forster's Land Act of 1881 provided for fair sale, fair rents, and fixity of tenure in Ireland, and the Third Reform Act in 1884 gave to the country the universal suffrage already practically established in the towns.

The chief interest of English politics in recent years has centred in the local government acts, Home Rule measures for Ireland, and the South African War. The local government measures (1888, 1892, 1899) took the local government out of the hands of the gentry by the establishment of county councils (q.v.) elected by the people. Under this act Greater London at last received the self-government it had so long deserved by being organized as a county. The proposed Home Rule acts were a result of the demands of the great majority of the Irish people under the leadership of Charles Stewart Parnell. Gladstone's first act, in 1885, was rejected by the Commons, and caused the disruption of the Liberal Party. A strong minority, under the leadership of Lord Hartington and Joseph Chamberlain, revolted, and, assuming the name of Liberal Unionists, joined the Conservatives. Gladstone's second Home Rule measure (1895) was accepted by the Commons, but rejected by the Lords, and the next general election returned the Conservatives to power with Salisbury as Premier. The aggressive policy of Joseph Chamberlain, the Colonial Secretary, involved the nation in a bloody war with the two Dutch republics of South Africa in 1899. The beginning of the war was marked by brilliant victories of the Boers, but the overwhelming numbers of the British, under the able leadership of Lord Roberts, compelled the Boers to break up into small contingents. Though these little bands fought with bravery and persistence, and were in strategy superior to the enemy, they could rationally hope to accomplish little against such odds. The leaders were accordingly reduced to the necessity of at last signing the terms of peace, May 31, 1902. In the course of this struggle Queen Victoria died, January 22, 1901, universally lamented, and was succeeded by her son, Edward VII.

One great result of this war has been the loyalty to the mother country shown by the British colonies. The growth of democracy at home and the expansion of England into a vast colonial empire abroad are the two most prominent features of British political development in the nineteenth century. In 1867 the chief American colonies north of the United States were federated into the Dominion of Canada. A powerful commonwealth has grown up in Australia, and on January 1, 1901, was formed into a federation on the model of the United States. Cape Colony, which was wrested from the Dutch in 1806, has grown into an important country. These and several other of the colonies have been granted home rule on democratic principles, and their federation with the mother country into a vast empire is the most important question now confronting British statesmen.

BIBLIOGRAPHY. Of original sources for the history of early and mediæval England, mention may be made of the *Anglo-Saxon Laws*, edited by Thorpe (London, 1840); also the various collections in the "Rolls Series," the publication of which was begun at London in 1856. The best secondary sources for the period are Stubbs, *Constitutional History of England* (3 vols., Oxford, 1895-97), authoritative on all matters pertaining to constitutional development, but dealing only incidentally with political history. The best work for the political history of this period is the old one by Lappenberg and Pauli, *Geschichte von England* (5 vols., Hamburg, 1854-58); Green, *History of the English People* (4 vols., London,

1877-80), is especially good for the social conditions of the times; also Pearson, *History of England During the Early Middle Ages* (2 vols., London, 1867). Legal history is treated in the monumental work of Pollock and Maitland, *History of English Law* (2 vols., Cambridge, 1895); also Reeves, *History of English Law*, edited by Finlason (3 vols., London, 1869). On the army and navy in England during the Middle Ages, Köhler, *Die Entwickelung des Kriegswesen von der Mitte des 11. Jahrhunderts* (3 vols., Breslau, 1886-89); Oman, *History of the Art of War* (London, 1898). The fullest account of the English Church is in Makower, *Die Verfassung der Kirche von England* (Berlin, 1874), translated (London, 1895); a more popular account is to be found in the series edited by Stephens and Hunt, *A History of the English Church* (London, 1899-1902). For municipal history the best account is Gross, *Gild Merchant* (2 vols., Oxford, 1890). For limited periods or special topics the following are useful: On the Anglo-Saxons, Kemble, *The Saxons in England* (2 vols., London, 1842); more popular is Green, *The Making of England* (2d ed., 2 vols., London, 1897); Freeman, *History of the Norman Conquest* (6 vols., Oxford, 1867-79); Norgate, *England Under the Angevin Kings* (2 vols., London, 1887); Round, *Feudal England* (London, 1895); Pauli, *Simon von Montfort* (Tübingen, 1867); Prothero, *Life of Simon of Montfort* (London, 1877); Gasquet, *The Great Pestilence, 1348-49* (London, 1893); Pearson, *English History in the Fourteenth Century* (London, 1876); Wallon, *Richard II.* (2 vols., Paris, 1864); Ramsay, *Lancaster and York, 1399-1485* (2 vols., Oxford, 1892); Wylie, *History of England Under Henry IV.* (4 vols., London, 1884-98); Lodge, "The Last Plantagenet," in *Scribner's Magazine*, vol. xxi., pp. 232-48 (New York, 1897); Gairdner, *Introduction to the Paston Letters* (London, 1872-75). For a more extensive bibliography for English history down to 1485, consult the excellent work of Gross, *Sources and Literature of English History to 1485* (New York, 1900).

From 1485 to 1688. Of the sources only the great collections can here be cited. The *Calendar of State Papers*, embracing all State documents, home and foreign, now extends from 1509 to 1685. Cobbett's *Parliamentary History* (London, 1806), continued by Hansard's *Parliamentary Debates* to the present day, contains all Parliamentary proceedings. Consult also the official *Journals of the House of Lords* (London, 1577 to the present day), and of the *Commons* (beginning 1547); *Statutes of the Realm* (Record Commission, 1810-22); the *Publications of the Camden Society*, Gardiner's *Constitutional Documents of the Puritan Revolution* (Oxford, 1889). The whole period is covered by such general works as Green (see above); Lingard, *History of England from the First Invasion by the Romans* (London, 1825-31), written from the Catholic standpoint. Latest research, however, is best found in the special work like Busch, *England Under the Tudors*, English translation by Todd (London, 1895); Gardiner, *History of the Great Civil War, 1642-1649* (London and New York, 1894); id., *History of the Commonwealth and Protectorate* (New York, 1901), careful and scholarly. Consult also von Ranke's masterly work, *History of England, Principally in the 17th Century* (Oxford, 1875), for this and the succeeding period; Stern, "Geschichte der Revolution in England," in Oncken's *Allgemeine Geschichte* (Berlin, 1881); Carlyle, *Letters and Speeches of Cromwell* (London, 1845). For the economic development, consult: Cunningham, *Growth of English History and Commerce* (Cambridge, 1892); Traill, *Social England* (New York, 1895-97); Rogers, *Six Centuries of Work and Wages* (New York, 1884). Among the many constitutional histories, it is sufficient to cite Gneist, *History of the English Constitution* (Boston, 1898); Hallam, *Constitutional History of England from the Accession of Henry VII. to the Death of George II.* (London, 1887); Taylor, *Origin and Growth of the English Constitution* (Boston, 1898).

From 1688 to the Present Time. For the entire eighteenth and the early nineteenth century, the private correspondence and memoirs of prominent men are important; e.g. the titles cited under the names of the kings (as William III., George III.) and statesmen (e.g. Fox, Disraeli). Among modern authorities are Stanhope, *History of the Reign of Queen Anne* (London, 1870); id., *History of England, 1713-83* (London, 1851-54); Lecky, *History of England in the Eighteenth Century* (London, 1878-90); Macaulay, *History of England* (New York, 1856-62); Massey, *History of England During the Reign of George III.* (London, 1855-63); McCarthy, *History of the Four Georges* (London, 1885-90); Walpole, *History of England from the Conclusion of the Great War in 1815* (London, 1878-80); Martineau, *History of England, 1816-46* (London, 1849); Pauli, *Geschichte Englands seit der Friedensschlüsse von 1814 und 1815* (Leipzig, 1864); May, *Constitutional History of England* (New York, 1865).

Physical Features. Hull, *Contributions to the Physical History of the British Isles* (London, 1882); Anderson, *The Book of British Topography* (ib., 1881; Supplements, 1886, 1891); Jukes-Brown, *The Building of the British Islands* (ib., 1888); Haughton, *Descriptive, Physical, Industrial, and Historical Geography of England and Wales* (ib., 1893); Ramsay, *Physical Geography and Geology of Great Britain and Ireland*, ed. by Woodward (ib., 1894); Geikie, *The Rivers of Great Britain* (ib., 1897); Johnstone, *Mineral Geology* (Edinburgh, 1897); Fontane, *Aus England und Schottland* (Berlin, 1900); Mackinder, *Britain and British Seas* (London, 1901); *Cassell's Gazetteer* (6 vols., ib., 1893-98); the *Reports of the Geological Survey of the United Kingdom* (London, current); and the *Journal of the Royal Geographical Society* (London, current).

Mineral Resources. Galloway, *History of Coal Mining in Great Britain* (London, 1882); Hunt, *British Mining* (ib., 1884); Boyd, *Coal Pits and Pitmen* (ib., 1895); Hull, *The Coal-Fields of Great Britain* (ib., 1882); id., *Our Coal Reserves at the Close of the Nineteenth Century* (ib., 1897); Loze, *Les charbons britanniques et leur épuisement* (Paris, 1900).

Fauna. MacGillivray, *British Birds* (London, 1837-52); Yarrell, *History of British Birds* (3d ed., ib., 1856); Staveley, *British Insects* (ib., 1871); Bell, *History of British Quadrupeds* (ib., 1874); Wood, *Common British Insects* (ib., 1883); Seebohm, *History of British Birds* (ib., 1886); Nicholson, *Natural History: Its Rise and Progress in Britain* (Edinburgh, 1886); Lydekker, *Royal Natural History* (London, 1890);

Kappel and Kirby, *Handbook of British and European Butterflies and Moths* (ib., 1895); Carpenter, "The Problems of the British Fauna," in *Natural Science*, vol. xi. (ib., 1897); Parker and Haswell, *Manual of Zoology* (ib., 1900); also the *Transactions* (ib., 1835 et seq.) and *Reports* (ib., 1897 et seq.) *of the Zoological Society of London.*

FLORA. Sowerby, *English Botany* (12 vols., London, 1873-86); Watson, *Topographical Botany of British Plants* (ib., 1883); Babington, *Manual of British Botany* (2d ed., ib., 1881); Bentham, *Handbook of British Flora* (ib., 1887); Turnbull, *Index of British Plants* (ib., 1890).

AGRICULTURE. Prothero, *The Pioneers and Progress of English Farming* (London, 1880); Rogers, *History of Agriculture and Prices* (Oxford, 1882); Garnier, *History of English Landed Interest* (London, 1893); id., *Annals of the British Peasantry* (ib., 1895); Heath, *The English Peasant* (ib., 1893); Shaw-Lefevre, *Agrarian Tenures* (ib., 1893); Hasbach, *Die englischen Landarbeiter in den letzten hundert Jahren* (Leipzig, 1894); Channing, *The Truth About Agricultural Depression* (London, 1897); Graham, *The Revival of English Agriculture* (ib., 1899).

INDUSTRIES; COMMERCIAL DEVELOPMENT. Rogers, *Industrial and Commercial History of England* (London, 1892); id., *Six Centuries of Work and Wages* (ib., 1890); Cunningham, *The Growth of English Industry and Commerce* (ib., 1890-92); Webb, *History of Trade Unionism* (ib., 1894), which contains a bibliography; id., *Industrial Democracy* (London, 1897); Rousier, *The Labour Question in Great Britain* (ib., 1896); Bowley, *Wages in the United Kingdom in the Nineteenth Century* (London, 1900); Burgis, *Perils to British Trade and How to Avoid Them* (ib., 1895); Gastrell, *Our Trade in the World in Relation to Foreign Competition, 1885-95* (ib., 1897); Great Britain Colonial Office, *Trade in the British Empire and Foreign Competition* (ib., 1897); Porter, *British and American Industry* (Chesterfield, 1901); Gibbins, *Industry in England* (ib., 1896); Bevan, *English Manufacturing Industries* (13 vols., London, 1876); Holdsworth, *The Sea Fisheries of Great Britain and Ireland* (ib., 1883); Schulze-Gaevernitz, *The Cotton Trade in England and on the Continent*, trans. (ib., 1895); R. C. T. Jones, *The British Merchant Service* (ib., 1898); also the *Statesman's Year Book*, ed. by Keltie and Renwick (ib., annually); Whitaker's *Almanac* (ib., annually); and the *Statistical Abstract of the United Kingdom* (ib., annually).

TRANSPORTATION. Pattinson, *British Railways* (London, 1893); Pendleton, *Our Railways* (ib., 1893); Findlay, *Working and Management of an English Railway* (5th ed., ib., 1894); Grinling, *History of the Great Northern Railway* (ib., 1897); Acworth, *The Railways of England* (ib., 1900); Paish, *The British Railway Position* (ib., 1902); and the *Annual Reports of the Great Britain Railway Commission* (ib., 1874 et seq.).

GOVERNMENT. *Constitution:* Hallam, *Constitutional History of England* (8th ed., London, 1855); May, *Constitutional History of England* (3d ed., ib., 1871); id., *Treatise on the Law, Privileges, Proceedings, and Usage of Parliament* (10th ed., ib., 1893); Bagehot, *English Constitution* (ib., 1872; New York, 1882); Creasy, *The Imperial and Colonial Constitutions of the Britannic Empire* (ib., 1872); Freeman, *The Growth of the English Constitution from the Earliest Times* (new ed., London, 1873); Stubbs, *Constitutional History of England: Its Origin and Development* (3 vols., ib., 1877); Boutmy, *Le développement de la constitution et de la société politique en Angleterre* (Paris, 1887; new ed. 1897), trans. as *The English Constitution* (London, 1891); Gneist, *Englische Verfassungsgeschichte* (Berlin, 1882), English trans. (4th ed., London, 1895); Burgess, *Political Science and Constitutional Law* (Boston, 1890); Wendt, *England, seine Geschichte, Verfassung und staatlichen Enrichtungen* (Leipzig, 1892); Goodnow, *Comparative Administrative Law* (New York, 1893); Anson, *The Law and Custom of the Constitution* (Oxford, 1896); Taylor, *Origin and Growth of the British Constitution* (Boston, 1898); Macy, *The English Constitution* (New York, 1899); Wilson, *The State* (Boston, 1901); Hall, *Treatise on the Foreign Powers and Jurisdiction of the British Crown* (Oxford, 1894); Pike, *A Constitutional History of the House of Lords* (London, 1894). *Parliament:* Green, *The Making of England* (new ed., London, 1897); Ramsay, *The Foundations of England* (ib., 1898-1902); Todd, *Parliamentary Government in England*, ed. by Walpole (3d ed., ib., 1892); id., *Parliamentary Government in the British Colonies* (ib., 1894); Gneist, *Das englische Parlament in tausend jährige Wandelungen* (Berlin, 1881; trans., 4th ed., London, 1891); G. B. Smith, *History of the English Parliament* (London, 1892); Jephson, *The Platform: Its Rise and Progress* (ib., 1892); Dickinson, *The Development of Parliament During the Nineteenth Century* (ib., 1895); Carr-Comm, *Handbook of the Administrations of Great Britain During the Nineteenth Century* (ib., 1901); also *Hansard's Debates*, and for special periods, the "Epochs of English History Series," and the authorities referred to in this bibliography under HISTORY. *Politics:* Lecky, *History of England in the Eighteenth Century* (New York, 1878-90); Dilke, *Problems of Greater Britain* (London, 1890); id., *British Empire* (ib., 1899); Seeley, *The Expansion of England* (ib., 1893); id., *Growth of British Policy* (ib., 1895); Seignobos, *Histoire politique de l'Europe contemporaine* (Paris, 1897); Burrows, *History of Foreign Policy of Great Britain* (London, 1897); Canning, *British Rule and Modern Politics* (ib., 1898); Sanderson, *The British Empire in the Nineteenth Century* (6 vols., ib., 1898); Goldwin Smith, *The United Kingdom: A Political History* (ib., 1899); Wilkinson, *War and Policy* (ib., 1900); Arnold-Foster, *The War Office, the Army, and the Empire* (ib., 1900); Bérard, *L'Angleterre et l'impérialisme* (Paris, 1900); Jose, *Growth of the Empire: Handbook to History of Greater Britain* (London, 1901); Hobson, *Imperialism* (London, 1902); Butler-Johnstone, *Imperial Federation and Polity* (ib., 1902); Bonwick, *The British Colonies and Their Resources* (London, 1886); Caldecott, *English Colonization and Empire* (New York, 1891); Egerton, *Short History of British Colonial Policy* (London, 1897); Creswell, *The Growth and Administration of the British Colonies, 1837-97* (ib., 1898); Lucas, *Historical Geography of the British Colonies, 1837-97* (ib., 1898); Zimmerman, *Die europäischen Kolonien*, vol. ii. (Berlin, 1899); also the *Annual Register* and the various official reports,

Blue Books, etc. For political history before the eighteenth century and for special periods, consult the authorities referred to in this bibliography under HISTORY; and for a concise general survey, consult Acland and Ransome, *Handbook in Outline of the Political History of England* (London, 1895). *Local:* Chalmers, *Local Government* (London, 1883); Dowell, *A History of Taxation and Taxes in England* (2d ed., London, 1888); Goodnow, *Municipal Government in Great Britain* (New York, 1895); Maltbie, *English Local Government* (ib., 1897); Wright and Hobhouse, *Outline of Local Government and Local Taxation in England and Wales* (London, 1898); Odgers, *Local Government*, in "English Citizen Series" (ib., 1899); *The English Citizen: His Rights and Responsibilities* (13 vols., London, 1881-85); Graham, *Taxation, Imperial and Local* (ib., 1899).

FINANCE. Giffen, *Essays in Finance*, 2 series (London, 1880, 1886); Buxton, *Finance and Politics* (ib., 1888); Bagehot, *Lombard Street: A Description of the Money Market* (10th ed., ib., 1893); Conant, *History of Modern Banks of Issue* (ib., 1896); Turner, *Chronicles of the Bank of England* (ib., 1897); Stephens, *Contributions to Bibliography of the Bank of England* (ib., 1897); Root, *Studies in British National Finance* (Liverpool, 1901); also the Blue Books, *Journal of the Royal Statistical Society* (London, quarterly), and the authorities referred to in this bibliography under *Industries; Physical Features;* and *Government*, sections Politics and Local Government.

DEFENSE. *Army:* Wolseley, *The Standing Army of Great Britain* (London, 1893); Dilke and Wilkinson, *Imperial Defence* (ib., 1892); Clarke, *Fortification* (ib., 1890); id., *Imperial Defence* (ib., 1897); King, *Story of the British Army* (ib., 1897); Fortescue, *History of the British Army* (ib., 1899); and, for the Volunteers, Wilkinson, *The Volunteers and the National Defence* (ib., 1891; reissued 1896). *Navy:* Lord Brassey, *The British Navy* (5 vols., London, 1882-83); James, *The Naval History of Great Britain* (6 vols., ib., 1886); Mahan, *The Influence of Sea Power upon History* (ib., 1890); Colomb, *Naval Warfare* (ib., 1895); Hamilton, *Naval Administration* (ib., 1896); Williams, *A Short History of the Growth of the British Navy* (ib., 1894-98); Eardley-Wilmot, *Our Navy for a Thousand Years* (ib., 1899); id., *Our Fleet To-day and Its Development During the Past Half Century* (ib., 1900); Clowes, *The Royal Navy* (5 vols., ib., 1897-1900); and, for the Naval Reserve, Brassey, *The Royal Naval Reserve, the Mercantile Marine, and the Colonies* (London, 1895).

EDUCATION. Bisson, *Our Schools and Colleges* (London, 1883-84); Jebb, *The Work of the Universities for the Nation, Past and Present* (Cambridge, 1893); Leclerc, *L'éducation des classes moyennes et dirigeantes en Angleterre* (Paris, 1894); id., *L'éducation et la société en Angleterre* (ib., 1894); Parmentier, *Histoire de l'éducation en Angleterre* (ib., 1896); Lyte, James, and others, *Great Public Schools* (London, 1896); Morley, *Studies in Board Schools* (ib., 1897); Balfour, *The Educational Systems of Great Britain and Ireland* (ib., 1898); and the *Annual Reports* of the Board of Education of Great Britain.

RELIGION. Consult the authorities referred to under ENGLAND, CHURCH OF; also, Patteson, *Rise and Progress of Religious Life in England* (London, 1864); Stoughton, *History of Religion in England* (6 vols., ib., 1881); id., *Religion in England: First Half of Present Century* (ib., 1884); Gasquet, *The Eve of the Reformation* (New York, 1901); Fitzgerald, *Fifty Years of Catholic Progress in England* (London, 1900).

ETHNOLOGY. Consult the authorities referred to under ENGLAND.

GREAT BRITAIN, ROYAL ARMS OF. The arms of the United Kingdom of Great Britain and Ireland are quarterly, first and fourth gules, three lions passant gardant in pale, or, for England; second, or, a lion rampant within a double tressure flory counterflory gules, for Scotland; third, azure, a harp or stringed argent, for Ireland; all surrounded by the garter.

Crest.—Upon the royal helmet, the Imperial crown proper, thereon a lion statant gardant or, imperially crowned, also proper.

Supporters.—Dexter, a lion rampant gardant, or, crowned as the crest. Sinister, a unicorn argent, armed crined, and unguled or, gorged with a coronet composed of crosses pattée and fleur-de-lis, a chain affixed thereto, passing between the fore legs, and reflexed over the back, also or.

Motto.—*Dieu et mon Droit* in the compartment below the shield, with the union rose, shamrock, and thistle ingrafted on the same stem. For illustration of Arms of Great Britain, see Colored Plate of National Coats of Arms in article HERALDRY.

Arms have been ascribed by heralds to the Saxon and Norman monarchs of England in the tenth and eleventh centuries; but as heraldry was, in point of fact, unknown till the middle of the twelfth century, the ascriptions must be dealt with as fabulous.

The *supporters* borne in former times by the Kings of England varied much, particularly during the earlier period when these appendages of the shield were invested with more of a decorative than an heraldic character, and perhaps often left to the fancy of the engraver. James I. for the first time clearly defined the royal supporters, adopting the lion of England and unicorn of Scotland as they have ever since been borne, the unicorn having been, up to 1707, allowed the precedence in Scotland.

GREAT CATAW'BA. See WATEREE.

GREAT CHAM OF LITERATURE, THE. A title given by Smollett to Samuel Johnson, in a letter to John Wilkes.

GREAT CHARTER. See CHARTER.

GREAT CIRCLE SAILING. See SAILINGS.

GREAT COMMONER, THE. A popular title of the elder Pitt, who, though he became Earl of Chatham, was a member of the House of Commons and not of the House of Lords.

GREAT-CRESTED FLYCATCHER. See KINGBIRD.

GREAT DANE. A dog. See HOUND.

GREAT DAU'PHIN, THE. A name given to the Dauphin Louis, son of Louis XIV.

GREAT DUKE. A title given to the Duke of Wellington.

GREAT DUKE OF FLORENCE, THE. A drama by Massinger, licensed in 1627 and published in 1635.

GREAT EASTERN. At the time of her construction, the largest ship in the world. It was not until 1901, when the *Celtic* was completed, that her equal in size was produced. She was never a financial success, having been built when the trade and conditions suitable to a ship of her size did not exist. In 1852 the Eastern Steam Navigation Company was formed, to maintain an ocean steam route to the East round the Cape of Good Hope. In 1853 the directors came to a conclusion that, owing to the cost of maintaining coaling stations on the way, such a route would not pay unless the ship could carry coal enough for the voyage out and home, besides a large number of passengers and a great cargo. The scheme was for a ship that would accommodate 1000 passengers, 5000 tons of merchandise, and 15,000 tons of coal for fuel. The result was the construction of the *Great Eastern*. Her arrangements (setting aside later alterations) were briefly as follows: Length, 680 feet between perpendiculars, or 692 feet upper deck; breadth, 83 feet, or 118 over paddle-boxes; height of hull, 60 feet, or 70 to top of bulwarks. The propelling power comprised both paddle and screw. The paddle engines had 4 boilers, each with 400 brass flue-tubes; there were 4 engines, with cylinders of 14-feet stroke and 74 inches diameter; the paddle-wheels were 56 feet diameter by 13 deep, with 30 arms or radii. The screw engines had 6 boilers; the 4 engines had cylinders, each 4 feet stroke by 84 inches diameter, with piston-rods 7½ inches thick; the propeller-shaft was 160 feet long, and in some parts 24 inches in diameter, with a screw propeller 24 feet in diameter. The vast wall-sided compartments of the ship had facilities for conversion into cabins for 800 saloon passengers, 2000 second class, 1200 third class, and 400 officers and crew; or 5000 might have been accommodated in all, if emigrants or troops.

Twenty years of the ship's history presented a singular series of vicissitudes. During 1854-57 its building proceeded at Millwall. By November of the latter year the ship had advanced to the launching condition. Either the ship was too heavy (12,000 tons) or the slope was too gradual, for it required various attempts, between November 3, 1857, and January 31, 1858, and an expenditure of £60,000, to effect the launching. During 1858 and 1859 the work continued as fast as the company could supply money. Uncertain how far the original intention of a trade to and from Australia could be realized, the directors determined on a trial trip across the Atlantic. It was a disaster. The ship left the Thames September 8, 1859. An explosion of steam-pipes took place off Hastings; seven persons were killed and several wounded, and the voyage abruptly came to an end at Weymouth. The ship started again on June 17, 1860, from Southampton, and crossed the Atlantic in eleven days, reaching New York on the 28th. Continuing on this route during the remainder of 1860 and the greater part of 1861, she made many voyages to and fro, continually losing money for the owners and constantly requiring repairs. In December, when political relations with the United States looked ominous, the *Great Eastern* served as a troop-ship.

In 1864 negotiations were entered into with the Atlantic Telegraph Company and the Telegraph Construction and Maintenance Company for the employment of the *Great Eastern* as a cable-laying ship, and the arrangement and services of the ship in 1865 and 1866 will be found briefly noticed under ATLANTIC TELEGRAPH. In 1867 the vessel was reconverted from a cable-laying to a passenger ship, in order to provide for the travel to the Paris Exposition, and extensive renewals of machinery were made. The ship started from Liverpool for New York in May; but the speculation proved an utter failure.

In 1868 a new arrangement was made by which the ship was to be permanently chartered by the Telegraph Construction and Maintenance Company. The name, which had been changed from *Leviathan* to *Great Eastern*, and then to *Great Ship*, was again changed to *Great Eastern*. Between 1869 and 1874 the *Great Eastern* successfully laid some of the most important telegraphic cables—across the Atlantic, in the Mediterranean, in the Red Sea, etc.; in 1884, became a coal hulk in the harbor of Gibraltar; in 1887 was sold, to be broken up, for $82,500.

The following table gives a comparative statement as to the more recently built steamships, showing the proportionate developments:

NAME OF SHIP	When completed	Length between perpendiculars, feet	Length over all, feet	Beam, feet	Depth, feet	Gross tons
Great Eastern	1859	680	692	83.	48.2	18,915
Campania and Lucania	1893	600	622.	65.25	41.5	12,500
Kaiser Wilhelm der Grosse	1898	625	648.6	66.	43.	14,349
Oceanic	1899	685	704.	68.4	49.	17,274
Celtic	1901	.....	698.7	75.4	49.	20,880
Kaiser Wilhelm II	1902	.....	706.5	72.	52.5	19,500
Two vessels building at New London, Conn., for the trans-Pacific service of the Great Northern Railroad	Bldg. (1903)		630.	73.5	55.7	21,000

GREAT ELECTOR, THE (Der grosse Kurfürst). A name given to Frederick William, Elector of Brandenburg (1640-88), who, because of his wisdom and labors in behalf of his people, is looked upon as the founder of Prussia's present greatness.

GREAT EXPECTATIONS. A novel by Charles Dickens, originally issued in *All the Year Round* (1860 to 1861), published 1861. The story opens with the kindness shown by a child, Pip, to an escaped and starving convict, who, when his little benefactor has grown to early manhood, pensions him anonymously. The climax of the tale is the disillusion of Pip when the convict, whose hard-earned wealth he has accepted, is finally recaptured and dies in prison, and the great expectations vanish.

GREAT FALLS. A city and the county-seat of Cascade County, Mont., 98 miles northeast of

Helena; on the Missouri River, and on the Great Northern and other railroads (Map: Montana, D 2). It is in a productive mining region, and is noted for its great copper, gold, and silver smelting works; besides these metals, lead, iron, bituminous coal, and sandstone are found in the vicinity. The city has also extensive manufactures of flour. There are two steel wagon bridges 1000 feet long, two railroad bridges, a public library, and a park system which includes seven parks, aggregating 530 acres. The locality presents great scenic attractions. The most notable of its waterfalls are Rainbow and Great Falls, from the latter of which the city derives its name. The water-power, at medium low water, equals 350,000 horse-power, and this, together with inestimable mineral wealth, has contributed to the rapid growth of the city. Great Falls was settled in 1884, and incorporated four years later. The government is administered by a mayor, elected biennially, and a unicameral city council, the subordinate officials being nominated by the executive and confirmed by the council. The city owns and operates its water-works. Population, in 1890, 3979; in 1900, 14,930.

GREAT FISH, or BACK, RIVER. A river of Mackenzie and Keewatin, Dominion of Canada, rising in a small lake near the north shore of Lake Aylmer (Map: Canada, K 9). It flows through lakes Beechy, Pelley, and Garry, and enters the Arctic Ocean by a wide estuary, off the entrance to which is King William Land, after a northeast course of about 500 miles. It was explored in 1834-35 by Sir George Back (q.v.), who describes the Ah-hel-Dessy, or Parry Falls, on one of the tributaries, as "surpassing Niagara Falls in splendor of effect." Montreal Island, in the estuary, has a melancholy interest in connection with the discovery of the final relics of Franklin in 1859.

GREAT FISH RIVER. A river in Cape Colony, rising in the Sneeuwberg, or Snowy Mountains, and, after a generally southeasterly course of 230 miles, entering the Indian Ocean about 5 miles northeast of Port Alfred (Map: Cape Colony, K 8). A bar at its mouth renders it inaccessible to ships. The Midland Railway from Port Alfred and Port Elizabeth skirts its banks upward from Commadagga to Middleburg.

GREAT HARRY. A three-masted vessel built under Henry VII. in 1509, at a cost of £14,000, the first double-decker to be built in England, and the first war-vessel of the British Navy. She was burned by accident at Woolwich in 1553.

GREAT HAR'WOOD. A coal-mining town in Lancashire, England, three miles northwest of Accrington (Map: England, D 3). Population, in 1891, 9100; in 1901, 12,000.

GREAT'HEART, Mr. The brave guardian of Christiana and her children, and their guide to the Celestial City, in Bunyan's *Pilgrim's Progress*.

GREAT HORNED OWL. See EAGLE-OWL.

GREAT KANAWHA, kȧ-nạ'wȧ. A large river of West Virginia. It rises between the Blue Ridge and Iron Mountains, in northwestern North Carolina, whence it flows north-northeast under the name of the New River through the western part of Virginia; then turning to the northwest, it breaks through several ridges of the Alleghanies (Map: West Virginia, C 3). After receiving Gauley River in Fayette County, W. Va., it takes the name of Great Kanawha, flows for about 100 miles through a picturesque region abounding in coal, salt, and iron, and joins the Ohio River at Point Pleasant, after a total course of about 400 miles. By means of a system of locks and movable dams, constructed at a cost of $4,000,000, slack-water navigation has been made possible throughout the year up to the picturesque Kanawha Falls, about two miles below the mouth of the Gauley.

GREAT LAKES. A series of inland seas comprising lakes Superior, Michigan, Huron, Saint Clair, Erie, and Ontario. They lie on the frontier of the United States and Canada and are drained by the Saint Lawrence River into the Atlantic. Their aggregate area is over 90,000 square miles, exceeding that of any other series of fresh-water lakes in the world. Lake Superior, the largest, has an area of about 31,000 square miles. The Great Lakes occupy depressions that are only slightly defined from the drainage system of the Mississippi and from the depression of Hudson Bay. Their elevation ranges from about 600 feet in Lake Superior to 250 feet in Lake Ontario, but from Lake Superior to Lake Erie the fall is less than 30 feet, so that almost the entire descent is accomplished in the Niagara and Saint Lawrence rivers. The Great Lakes exercise a very beneficial influence upon the climate of the country, particularly by moderating the temperature. This explains the extensive development of fruit culture in parts of the Great Lake region, notably in the vicinity of Lake Erie.

The magnitude and importance of transportation upon the Great Lakes are not generally realized. More than one-half of the number of vessels registered in the United States are found upon the Great Lakes, and excepting the vessels belonging to one particular ocean steamship line, the average tonnage of the Lake vessels exceeds that of all other American craft. A greater tonnage annually passes through the Detroit River than that which enters and clears in the foreign trade of the Atlantic and Pacific coast ports. No other artificial channel equals the canal at Saint Mary's Falls in the amount of traffic which annually goes through it, the tonnage even exceeding that of the Suez Canal. With respect to rapidity, economy, and efficiency, the lake traffic excels that of the ocean. The coastal line of the Great Lakes touches eight of our States. Their aggregate population is over one-third that of the Union. The sailing distance from Duluth to Buffalo is 997 miles, from Chicago to Buffalo, 929 miles, and from Duluth to Ogdensburg, 1235 miles. The vast region tributary to the Great Lakes is the richest part of the country in the products of farm, forest, and mine. The bulkiness of these products is such that a water route becomes of especial value in their transportation. The greatest significance of the lakes is due to their relation to the mining of iron ore and the manufacture of iron products. Viewed in this light, lake transportation is found to be the key to the modern industrial progress and supremacy of the United States. It is generally admitted that but for the cheapness of the lake transportation the iron ore resources of the Lake Superior region would have been scarcely exploited. Without the supply of iron ore many vast industries could not have thrived.

The nature of shipping and its development have been closely dependent upon the depth of the channels connecting the different lakes, particularly the passages between Lake Superior and Lake Huron, and between the latter and Lake Erie. Prior to 1858 the channel entering Lake Saint Clair was only 9½ feet in depth, but by means of appropriations of the United States Government one of the entering channels was deepened to 13 feet by 1871, and to 16 feet by 1874, in which state it remained until 1887, when the work of deepening began anew and it was completed to a depth of 20 feet. The Detroit River was not originally so shallow, and with the improvements given it during the period from 1874 to 1890 a channel 20 feet deep was secured for a breadth of 440 feet. The Canadian Government is now constructing a canal from Lake Saint Clair to Lake Erie which will greatly shorten the route. The construction of the first canal at Saint Mary's Falls was begun under a land grant of the State of Michigan by a private corporation in 1853, and was opened with a depth of 12 feet in 1855. Under an appropriation of the United States Government the canal was deepened between 1870 and 1881 to a depth of 16 feet, and has since been excavated to a depth of 20 feet. Canada has also constructed a canal around these falls, but it is much less used than the United States Canal. The Welland Canal, connecting Lake Erie and Lake Ontario, has been completed by the Canadian Government to a depth which admits the passage of vessels with a draught of 14 feet. The United States canals are free. With each successive deepening of the channels the size and draught of the vessels constructed have been increased with a resulting cheapening of the rates, which in turn has tended to increase the traffic and stimulate the tributary industries. A number of vessels now in use have a draught of 17 feet. Some of them have a length of 500 feet and carry 8000 tons of cargo.

Besides their great length these vessels differ from the ocean type in that they are flat-bottomed, the purpose being to carry the greatest possible cargo on the shallow draught to which they are limited. On no other waters is so great a cargo carried on so small a draught. Many of the larger vessels besides carrying their own cargo take one or more barges or sailing vessels in tow. Many of the vessels classed as sailing vessels are little more than barges, their sails being spread only when the wind is especially favorable. Prior to 1883 the tonnage of the sailing vessels exceeded that of the steam vessels, but since that date the tonnage of sailing vessels has remained about constant while that of steam vessels has almost trebled. In 1897 the gross tonnage of steam vessels was 975,000 tons, the sail vessels a little over one-third that amount, and the barges 55,000 tons. The total gross tonnage of the lakes increased from about 450,000 tons in 1870 to 690,000 tons in 1886 and 1,370,000 tons in 1897. The accessibility to resources of coal and iron has given the lake region unequaled advantage in the construction of ships. In 1897 the 120 vessels built on the Great Lakes had a greater tonnage than the 137 vessels built in other parts of the United States. Treaty provisions prevent the United States from building war vessels on these waters. The increase in lake traffic has been much greater than the increase in tonnage. This is due to the greater rapidity both of sailing and of loading and unloading vessels. The efficiency in the latter respect is not equaled in any other part of the world. A round trip from the head of Lake Superior to the eastern Lake Erie ports is now made in ten days. Thus an average of twenty round trips in a season can easily be made. Freight rates have fluctuated greatly from year to year so that the comparison of years may be misleading, but the general downward tendency has been very rapid. At the end of the nineteenth century coal was carried from Buffalo to Duluth at the rate of one-half mill per ton mile, which was only a small fractional part of the expense by rail. Wheat was carried the same distance at a per mile rate that was cheaper than that current in ocean traffic. The fact that coal constitutes a large product for return shipment makes a much lower rate possible than could otherwise be secured. The movement of freight upon the lakes is characterized by the great predominance of the east-going traffic over the west-going trade (especially the east-going traffic from the Lake Superior region), and by the importance of the Lake Erie ports for the exchange of the east-going for the west-going products, and by the fact that the bulk of the traffic centres upon a very few commodities.

Formerly the lower lake region was of greater relative importance, but in consequence of the enormous increase in iron mining in the Superior region, and also the increase in lumbering and grain raising in the tributary region during the last decade of the nineteenth century, the increase in the tonnage of lake shipments during that period was mainly in the tonnage originating in the Lake Superior region. The concentration of the transfer of the east-going for the west-going traffic on the Erie coast is due principally to the fact that it is through these ports the iron ore must pass to reach the coal and the smelting region, while in turn, in consequence of the nearness of these ports to the coal mines, they are the most convenient points for the loading of the coal, which constitutes the bulk of the west-going freight. Lumber also finds the shortest route to the manufacturing centres through these ports, and grain here makes connection with the Erie Canal, whence there is an easy transit to the Atlantic coast. It is probable that the latter product would be carried on the Saint Lawrence route much more extensively than it is if the canal around the Niagara Falls were to be deepened so as to admit the passage of the large lake vessels. According to the Government reports for 1900 the total net tonnage of freight upon the lakes was 36,033,200 tons, distributed as follows: Receipts of mining products, 23,541,203 tons; receipts of agricultural products, 5,220,285 tons; receipts of forest products, 3,523,188 tons; receipts of manufactured products, 277,393 tons; receipts of miscellaneous products, 3,471,131 tons. The commerce through the Detroit River on the part of vessels registered at American ports increased from 21,684,000 tons in 1890 to 30,000,000 in 1899.

The registered tonnage passing through the Saint Mary's Falls Canal in 1860 was 403,657 tons; in 1890 8,454,435 tons, and in 1900 23,315,834 tons. The net tonnage passing through the canals in 1900 was 25,643,073. Of this 20,532,493 tons was eastbound—19,102,494 tons going through the United States Canal. The number of

vessels entering the main lake ports in the season ending November 30, 1900, was as follows: Chicago, 7099; Buffalo, 3684; Cleveland, 3343; Milwaukee, 3057; Detroit, 2272; and Duluth, 1901. The bulk of the lake traffic is American, only 11 per cent. being Canadian.

There are numerous harbors along the coast line of the lakes. Many of these havens are shallow, and constant dredging is required to keep them accessible. The National Government has expended large sums on harbor improvements. In late years there has been a serious lowering in the level of the lakes' surface, to the great detriment of the harbors. Different plans have been projected for preventing further harm in this respect. Dams have been constructed across the exit channels of the lakes. One of the most serious disadvantages with which the lake commerce has to contend is the winter ice, which stops all traffic. The cessation of general lake traffic begins about the first of December and continues four or five months, about 222 days being the average annual time during which the canals are open. Much has recently been done to continue the period of traffic by the construction of boats with special provisions for ice crushing. A railroad ferryboat has also been constructed which is able to crush its way through three feet of ice.

The problem of the further improvement and increase of lake transportation is one of much significance to the country and has occasioned a great deal of interest and speculation. Schemes have been projected with the view to making the lake ports directly accessible to ocean-going vessels. The interests of Canada as well as those of the United States are involved in the proposed improvements, thus occasioning a rivalry between the two nations. For instance, an all-United States route is proposed, known as the Oswego, Oneida, Mohawk Valley and Hudson Route. An All-Canadian route is also proposed which connects the Georgian Bay with the Ottawa River. A proposed international route includes the Saint Lawrence River, Lake Champlain and Hudson River.

The Great Lakes are valuable for their fisheries. Nearly $4,500,000 of fish is taken from them annually, considerably over half by American fishermen.

GREAT LAKE TROUT. See NAMAYCUSH.

GREAT MANITOULIN, măn′ĭ-tōō′lĭn. See MANITOULIN ISLANDS.

GREAT MAR′LOW. See MARLOW.

GREAT MAR′QUIS, THE. A surname of the famous Portuguese statesman the Marquis de Pombal (1699-1782), and also of the noted Scotch statesman the first Marquis of Montrose (c.1612-50).

GREAT MASTER OF LOVE. A title given by Petrarch to Arnaut Daniel, the troubadour who invented the sestina.

GREAT MOTHER (Lat. *Magna Mater*). An epithet applied by the Romans to the goddess Cybele, or Rhea, as the representative of the procreative powers of nature.

GREATOREX, grāt′ô-rĕks, ELIZA (PRATT) (1820-97). An American artist, born at Manor Hamilton, Ireland. She came to New York in 1840, and in 1849 married Henry W. Greatorex, the organist and composer. She studied art in New York in 1854-56, and in Paris in 1862. At first she produced many landscape paintings, but afterwards devoted herself to etching and to pen-and-ink work. In 1868 she was elected an associate of the National Academy. About that time she began a series of sketches of historic buildings and scenes in and around New York. She was in Germany in 1870, and in the following year, where she published *The Homes of Oberammergau*. Returning to the United States, she published: *Summer Etchings in Colorado* (1873), and *Old New York from the Battery to Bloomingdale* (1876).

GREAT PACIF′ICATOR, THE. A sobriquet of Henry Clay, based upon his services in harmonizing conflicting interests through the Missouri Compromise.

GREAT PEDEE′ RIVER. The name of the Yadkin River after it enters South Carolina (Map: South Carolina, E 2). The stream rises in the Blue Ridge in northwestern North Carolina, and flows through the State in a south-southeast direction. In South Carolina it receives the tributaries Little Pedee and Waccamaw, and empties into the Winyaw Bay at Georgetown. It is navigable for 150 miles.

GREAT′RAKES, VALENTINE (c.1628-83). An Irish soldier and 'healer,' born at Affane, County Waterford. At the outbreak of the Irish Rebellion in 1641 he fled to England, and for six years lived in the homes of relatives. From 1649 to 1656 he served in Ireland under Cromwell. About 1661 he felt that he had been given divine healing power, and had what seemed to be remarkable success in 'touching' for scrofula, ague, and other diseases, though an exhibition before the King proved a failure. Several pamphlets by medical men and other critics were published, attributing his cures to miraculous agencies, and in 1666 Greatrakes published a vindication of himself entitled *A Brief Account*, accompanied by numerous testimonials. He retired soon afterwards to his estate at Affane, where he died.

GREAT RIFT VALLEY. The name given to a great depression which extends from Palestine in Asia to the southern end of Lake Tanganyika in Central Africa. The depression is formed really by a series of rift valleys which begins in the north with the Jordan and Dead Sea valleys, extending thence through the Red Sea basin to the strait of Bab-el-Mandeb, and across French Somaliland and Abyssinia to Lake Rudolf in British East Africa. Here the depression divides; one branch runs southward to beyond Lake Manyara, and the other takes a westerly course to Albert Nyanza, where it turns southward to the shores of Lake Tanganyika. The Great Rift Valley owes its origin to long parallel fissures or cracks in the earth's crust between which the strata have subsided, forming narrow, elongated troughs. In Central Africa the valley is frequently limited on either side by bare walls of rock which rise precipitously to the level of the adjoining plateau—4000 to 5000 feet above the sea. Elsewhere the evidence of faulting is not so apparent. Most of the great African lakes are situated in this valley. The formation of the fissures was accompanied by enormous volcanic activity, of which there are evidences in great sheets of lava, extinct volcanoes, and a few active cones. See AFRICA.

GREAT SALT LAKE. An extensive sheet of salt water in northwestern Utah, near which is situated Salt Lake City. It lies in one of the great valleys of the Rocky Mountains, on the eastern edge of the Great Basin (q.v.), and is about 75 miles long, and 30 to 50 miles wide. There are nine islands in the lake, one of which is 16 miles and another 12 miles in length. The lake occupies a shallow depression, with an average depth of less than 20 feet; the surface lies about 4250 feet above sea-level. Owing to the annual variation of rainfall in the region, the lake is subject to great fluctuations in area; in 1850 its area was 1750 square miles, but it had increased to 2170 miles in 1869. During the period 1880-90 the waters subsided considerably, but recently they have again begun to rise. The lake receives from the south, through the Jordan River, the waters of Utah Lake, which are fresh, and from the north the drainage of Bear River, but it has no outlet. Its water is a concentrated natural brine, containing about 22 per cent. of sodium chloride, slightly mixed with other salts, and having a specific gravity of 1.1+. The manufacture of salt by evaporation of the lake water is an important industry. The only animals known to live in the water are a small shrimp (Artemia gracilis) and the larva of a fly (Ephydra gracilis). The first mention of Great Salt Lake was by Baron La Hontan in 1689, who gathered some information concerning it from the Indians west of the Mississippi. It was first explored and described by Frémont in 1843. A survey was made in 1849-50 by Stansbury, and more elaborate surveys in recent years by the United States Geological Survey. Gilbert has shown that the lake in Pleistocene time covered a much larger area. (See LAKE.) Garfield Beach, on the southern shores of Great Salt Lake, is a bathing resort visited by many tourists for the novelty of a bath in the waters, which are so heavy that the body easily floats. See UTAH.

GREAT SEAL. The official sign of the royal authority in England. All documents of importance emanating from the Crown, as grants, charters, and writs, were required to be authenticated by it. It was called "The key of the kingdom," and was intrusted to the Lord Chancellor, who was also known as the Lord Keeper of the Great Seal. In the reign of Edward I. it became customary to issue writs under the privy seal, which might be affixed by any secretary of the King, but this practice was forbidden by statute in 1300. By act of union between England and Scotland (5 Anne, ch. 8), one great seal for the United Kingdom of Great Britain is used for sealing writs to summon Parliament, for treaties with foreign States, and all public acts of State affecting Great Britain. The holder of the great seal is still the Lord Chancellor. A seal is also kept in Scotland for sealing grants and writs affecting private rights there. As regards Ireland, the Act of Union (39 and 40 George III., ch. 67) provided that various acts, as to summoning Parliament, etc., should be done under the great seal of the United Kingdom; but in other respects the great seal of Ireland is used in the same manner as before the union.

GREAT SLAVE LAKE. An extensive and irregular sheet of water in the Territory of Mackenzie, Canada (Map: Northwest Territories, F 2). It has an area of 7100 square miles. Its greatest length is about 300 miles, and its greatest breadth 60 miles. It is surrounded, especially on the north, by rugged and precipitous shores; it contains many islands, some of them wooded, and is wholly frozen over for six months of every year. On the north it receives the surplus waters of Lakes Aylmer and Artillery, and on the south those of Lake Athabasca through the Great Slave River. Its own surplus is carried off by the Mackenzie River to the Arctic Ocean.

GREAT SLAVE RIVER. A river of Athabasca and Mackenzie, Canada. It is the outlet of Lake Athabasca into Great Slave Lake, and flows in a northwest direction from the former to the latter (Map: Canada, H 4). It is about 300 miles in length; its banks in many parts are well wooded, and its course in the lower part lies through a fertile alluvial region. With the exception of 13 miles of falls and rapids near Fort Smith, it is navigable for river and sea-going steamers.

GREAT STONE FACE, THE. One of Nathaniel Hawthorne's short stories, which appeared in 1852 in *The Snow Image, and Other Twice-Told Tales.*

GREAT TOM. A 17,000-pound bell which hangs in the tower of the Tom Gate of Christ Church, Oxford, and is tolled at closing time, ten minutes after nine, every night.

GREAT UNWASHED, THE. A designation applied to the multitude. It was used by Sir Walter Scott, and is attributed to Edmund Burke.

GREAT VALLEY. The valley between the Blue Ridge and the Alleghanies (qq.v.).

GREAT WALL OF CHINA. See CHINESE WALL.

GREAVES, grāvz (from OF. *greves*, from *greve*, shin). Pieces of armor used as a defense for the legs, originally made of leather, quilted linen, etc., and afterwards of steel hollowed to fit the legs and fastened with straps behind.

GREAVES, JOHN (1602-52). An English mathematician. He was born at Colemore, graduated at Balliol College, Oxford, in 1621, and in 1630 became professor of geometry at Gresham College, London. He traveled in Southern Europe and Egypt, collecting valuable manuscripts, gems, and coins, and making measurements of monuments. In 1643 he was chosen professor of astronomy at Oxford, but five years later was ejected by the Puritans. Among his numerous works were: *Pyramidographia, or a Discourse on the Pyramids* (1646); *A Discourse of the Roman Foot and Denarius* (1647); and *Elementa Linguæ Persicæ* (1649).

GREAVES, LAUNCELOT. The hero of Smollett's novel of the same name.

GREBE (Fr. *grèbe*, from Bret. *krib*, Welsh, Corn. *crib*, comb). A bird of the family Podicipidæ, having the feet not webbed in the usual manner, but lobate; that is, with a separate membrane for each toe, united only at the base. The tarsi (shanks) are so much compressed as to be almost like blades. The claws are large and flat. The bill is about as long as the head, straight and conical. The wings are short. There is no visible tail. The legs are attached so far back that the birds when on land assume an erect position, like penguins. They walk with

difficulty, and all their motions on land are awkward. They sometimes shuffle along on their bellies like seals. But in water they are extremely agile; they swim rapidly, dive with extreme quickness if alarmed, and pass to very considerable distances under water. They feed on fishes, batrachians, crustaceans, and other aquatic animals, partly also on vegetable food. They are said sometimes to carry their young under their wings, and even to take them under water with them in diving to escape from enemies. The geographical distribution of the group is very wide, and some of its species are also very widely distributed. Grebe-shooting is a favorite amusement in some places. The grebe is pursued by a boat, while it seeks to escape by diving and swimming under water.

One incentive to this hunting is the demand of fashion for grebe-skins. The plumage of the breast is very dense, silky, and warm, and has been in great vogue for women's muffs and for hat and dress trimmings. Thousands of these interesting birds are sacrificed yearly for these trivial purposes—a slaughter which ought at once to be stopped. None of the grebes are bright-colored, black, brown, gray, and white being the usual shades, but a few forms have steel-blue, tawny, or rich reddish-brown markings on the head and neck. When in full breeding plumage some have the head ornamented with handsome tufts. In this condition their appearance is very different from that of the young or the adults in winter. Rather more than twenty species of grebes are known, of which at least half a dozen are North American. The best known of these is the dabchick, which is closely allied to the European little grebe (*Podiceps minor*). The American dabchick or pied-bill grebe, or 'hell-diver' (*Podilymbus podiceps*), is a common bird from the Argentine Republic northward to Hudson Bay, and it breeds locally throughout its range. It winters from the middle United States southward. It is small, not much more than a foot long, brownish-black above, fading into pure white on the belly. The bill is light bluish, encircled by a broad, black band. The dabchick is an exceptionally expert swimmer, and can swim for some distance with only its bill above water. The nest is made of vegetation in the water, sometimes practically floating on the surface, so that the young can take to the water as soon as they are hatched.

The largest American species is the Western grebe (*Æchmophorus occidentalis*), which is from two to two and one-half feet long, and has a straight, slender, and acute bill, three inches long. There are two very distinct varieties, one much smaller than the other, but both are common in the Western United States. The red-necked grebe (*Colymbus Holboellii*) is another large species, 19 inches long, found throughout North America, but in the United States only in winter. Two of the commonest American grebes are the horned grebe (*Colymbus auritus*) and the American eared grebe (*Colymbus nigricollis*, var. *Californicus*). The former is found throughout North America, the latter only west of the Mississippi. The smallest American grebe is the Saint Domingo grebe (*Colymbus Dominicus*), which is found in the warmer parts of America, and only as far north as the valley of the Rio Grande. It is less than 10 inches long, the bill is very short, and there are no crests or ruffs. The great-crested grebe of Europe (*Colymbus* or *Podiceps cristatus*) is a large and conspicuous species, 2 feet long; its occurrence in North America seems to be very doubtful. See Plate of ALBATROSS, AUKS, ETC.

GRECCHETTO, gre-ket'to, IL. See CASTIGLIONE, GIOVANNI BENEDETTO.

GRECIAN COFFEE-HOUSE. A well-known place of meeting for the wits of the eighteenth century, situated in Devereux Court, London. Steele humorously affected to write the more 'learned' papers of the *Tatler* there.

GRECIAN DAUGHTER, THE. Arthur Murphy's best-known tragedy, produced in 1772 and played as late as 1830.

GRECIAN GAMES. See GAMES, ANCIENT.

GREECE. A kingdom occupying the southern prolongation of the Balkan Peninsula, between the Ægean and Ionian seas. Its mainland extends southward from about latitude 40° N. to Cape Matapan in latitude 36° 23'. Its only land boundary is Turkey on the north. It includes, in addition to the provinces on the mainland, numerous islands, in both the Ægean and Ionian seas, its land area in the east being about one-fifth of the land surface of the Ægean Archipelago. The total area, 25,014 square miles, embraces 20,865 square miles of mainland and 4149 square miles of islands; in other words, the area of Greece is half that of England, or a very little larger than West Virginia. The arena was slightly reduced by the Treaty of 1897, ending the last war between Greece and Turkey, which added some parts of northern Thessaly to the Ottoman domain.

TOPOGRAPHY. The coast waters are shallow and penetrate far into the land, deep gulfs on opposite coasts dividing the mainland into Northern and Central Greece, and the peninsula of Peloponnesus, or the Morea. The Peloponnesus is connected with Central Greece by the Isthmus of Corinth, which at its narrowest part is only four miles wide, and which is pierced by a ship canal. No other country in the world has so large a proportion of coast to area as Greece. It has a mile of coast for every 10 miles of surface. The country is nearly cut in two by the gulfs of Corinth and Ægina. In spite of this fact, Greece is not rich in good harbors (except in a few central and highly favored parts of the country), owing to a wall of mountains which rises from the shore on long stretches of the coasts. Though the east coast has many fine ports, the harborless shores include the entire east sides of Thessaly, and of the long island of Eubœa, and the east side of the Peloponnesus, south of the Gulf of Argolis to the most southern rock mass of Cape Malia. Volo, on the gulf of that name, is the only port of Thessaly. The best harbor facilities are found in the beautiful Gulf of Ægina, where the fine natural harbor of the Piræus is the port of Athens, six miles inland. Still farther south the shores of the Gulf of Argolis, penetrating deeply into the Peloponnesus, are rich in harbors. The gulfs of Ægina and Argolis have always been the centre of Greek sea life; and the Gulf of Ægina contributed in no small measure to the influences that made Athens the centre of Greek culture. The south coast of the Peloponnesus is deeply indented by the Laconian Gulf (Gulf of Marathonisi, or Kolo-Kythia) and the Messenian Gulf (Gulf of Koroni). The west coast of the Pelo-

ponnesus is flat, low, and but little indented, while the north coast, washed by the waters of the Gulf of Corinth and its entrance, the Gulf of Patras, is high and steep, with a good harbor at Patras near fertile and highly cultivated plains. The west coast north of the Gulf of Patras is swampy in the south, high and mountainous in the north, but of small importance in the sea trade.

In its surface forms Greece preserves the characteristic aspects of the broader mass of the Balkan Peninsula (q.v.) to the north of it. It is preëminently a mountain land, the ranges of the Balkan Peninsula extending into and through the country. The wild chain of the Pindus, a dominating feature, forms the water parting, and sharply divides the larger western from the smaller eastern part of Greece as far south as the Gulf of Corinth. West of the Pindus the ranges of the Dinaric mountain system, which parallels the shores of the Adriatic farther north, pass through Greece to the southern end of the Peloponnesus. These chains are crowded so closely together that the valleys are very narrow, and there is little development of high mountain plains. The mountain chains of Northeastern Greece, on the other hand, are broadly distinguished from those of the west by the fact that their main direction is east and west. On the whole, the mountains are of only medium elevation, though Parnassus, the best-known summit of the eastern ranges, rises in the very heart of Greece to a height of 8065 feet; and Mount Taygetus, the culminating point of the Dinaric system in the Peloponnesus, is 7890 feet high.

The chains, frequently connected with one another by spurs, make a network of mountains throughout the country. The result is that Greece has no great middle point upon which its highways and activities converge. It is divided into a large number of small districts which are reached with difficulty over the mountain roads. The great bond of union is the sea, whose deep bays and gulfs serve the trade of the interior. Greece is rich in contrasts of color and in picturesque beauty; and the charm of its landscapes is especially emphasized along the coastal indentations where the glowing colors of the bare mountain walls contrast with the deep blue of the sea between them. While there are many small plains among the highlands, the only great plains are those of Thessaly in Northern Greece. They are surrounded by mountains and nowhere reach the sea; comparatively level and woodless, but covered with alluvium, they are very fertile, the granary of the kingdom, the region where landscapes are most smiling and vegetation is most luxuriant. The Thessalian plains are separated by highlands extending northwest and southeast about midway between Larissa and Trikala. There are many small fertile plains in Bœotia, Messenia, Argolis, and along parts of the coast.

All the Greek islands are mountainous. They were once a part of the mainland, and the largest island in the Ægean Sea, Eubœa, is still so regarded, as it is separated from Central Greece only by the narrow Strait of Euripus, which at Chalcis is little more than 100 feet wide. Eubœa is the prolongation of the coastal mountains of Thessaly. The Greek islands in the Ægean Sea are of small fertility, though some islands of the Cyclades, particularly Naxos and Santorini, produce excellent fruits and wine. A chain of volcanic islands bounds the Cyclades on the south; and the little group of Santorini, midway between Europe and Asia, is one of the four centres of volcanic action in Europe. The eruptions of 1866 resulted in the appearance of some new small islands. The Ionian Islands near the west coast far surpass the Cyclades in size and fruitfulness. Encircling their central mountains are hilly lands and plains of extraordinary fertility. Corfu (the ancient Corcyra) is the largest of the group, the other important islands being Santa Maura (Leukas), Cephalonia, Ithaca, Zante, and Cerigo (Cythera).

Hydrography. The rivers of Greece are small, and none of them is important for navigation or water-power. As in some other Mediterranean regions, water flows only periodically in most of the river beds, which are dry through the greater part of the year. Only the largest rivers carry water to the sea at all times. Many of the rivers are swallowed up in 'sinks' in the limestone regions, reappearing far below and leaving large areas of parched lands which, if water were available, might be made very fertile by irrigation. The most important river is the Achelous, emptying into the Ionian Sea, north of the Gulf of Patras. The chief rivers of the Peloponnesus are the Alpheus and the Iri (Eurotas). During the autumn rains, floods are very frequent in the rivers, nearly all of which, rising in the mountains, are torrential. Corfu is the only island that can boast of a small perennial stream, the Messongi, which is navigable for a short distance. Lakes are numerous among the mountains. One of the largest, Lake Copais in Bœotia, has been converted into a fertile plain by drainage. Some lakes have no visible outlet, but the waters are sweet; their outlets are underground conduits leading through the limestone to rivers or directly to the sea.

Climate. While the climate of the main mass of the Balkan Peninsula gradually approaches that of the Mediterranean countries, the Mediterranean subtropical climate prevails in Greece except on the higher elevations. The climate has two peculiarities. One is the extreme heat and cold occasionally recorded. The hot enervating sirocco blasts from Africa make some of the summer days almost unendurable, so that during their prevalence labor in the fields of Thessaly is carried on at night; and winds from the neighboring snow mountains of the north tend to intensify the winter cold. The other peculiarity is the contrasts in climate that neighboring localities present, due to the great diversity of the surface. While the lowlands have hot, dry summers, and autumn and winter rains, the mountains are much cooler and have summer rains. There is little frost or snow in the lowlands, but the mountains are covered with snow in winter. The rainfall is considerable among the mountains of the west, while excessive droughts prevail in the east, so that many farm crops cannot be grown without irrigation. The soil is only moderately fertile except where much alluvium has overspread the rocks, as in Thessaly, where the land is very productive. The formation of humus is slow and meagre. Many slopes have been washed bare of soil by winter rains, so that much land once tilled has been abandoned.

Flora. Greece is very poor in timber, not a

GREECE,
CRETE, AND SAMOS.
TURKEY
Ionian Sea
Gulf of Saloniki
Gulf of Lepanto or Corinth
Gulf of Arcadia
Gulf of Koroni or Messenia
Gulf of Kolokythia or Laconia
Saloniki
Larissa
Volos
Trikala
Janina
Corfu
Arta
Karpenisi
Lamia
Salona
Levadia
Patras
Missolonghi
Zante
Pyrgos
Tripolitza
Argos
Nauplia
Kalamata
Sparta
Kythera
Kapsali
Kolokera
Lagia
Elaphonisos
Kitta
Sapienza
Skaramanga Mts.
Piræus
ATHENS
Athenæ
Trelo Vuno
Hymettus
ATHENS and Vicinity.
Longitud

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thirteenth part of the country being woodland; and numerous herds of goats tend to kill the young growths and prevent the rehabilitation of the forest areas, which were once far more extensive. The nature of the flora varies with altitude, three distinct zones being recognized. All the fruits and grains of the Mediterranean lands are raised from the sea-level to an elevation of 1500 feet. The tree zone is mainly between 1500 and 5000 feet, the oak and beech predominating in the lower, and conifers in the higher altitudes. There are still some fine forest areas among the mountains. Alpine conditions prevail above 5000 feet, where only a few wild plants find a foothold in the thin soil. Many of the mountains are almost bare of vegetation; and the natural vegetation on the plains only consists of grasses, scattered clumps of evergreen shrubs, and small patches of woodland.

Fauna. The bear, boar, fox, wildcat, lynx, and jackal are the most conspicuous wild animals. Several varieties of deer, hare, and rabbit, besides quails, partridges, and pheasants, are the game animals.

Geology. Western Greece, including two-thirds of the mainland and nearly all the Peloponnesus, is composed of the long, parallel limestone ridges of Tertiary formation, of the Dinaric mountain system, the narrow troughs that separate them being schists and sandstone. This mountain region is a part of the Karst system which extends along the Adriatic; for, farther north, it exhibits the characteristic Karst phenomena of caverns, sink-holes, and underground river channels, leaving much of the land dry and relatively barren. Some of the limestone has hardened into the purest marble. The same limestone formation built up the Ionian Islands, once a part of the mainland. The rocks of Northeast Greece are of a different character, being the continuation of the crystalline rocks that built up the mountains of Thrace and Macedonia. Farther south, the eastern part of Central Greece, the island of Eubœa, and the northeastern part of the Peloponnesus are covered with mountain chains of Mesozoic limestone extending in curves from west to east. The crystalline rocks of the Cyclades form the mountains, comparatively low, of these islands. Severe earthquakes often originate among the mountains. Greece is not rich in minerals, though the argentiferous lead-mines of Laurion, near the southeastern extremity of Attica, yield about 30,000 tons of lead a year. There is no coal except the lignite found in Eubœa. The lack of fuel prevents the large exploitation of the copper and iron fields, though important quantities of iron and zinc ores are obtained. Paros and Pentelicus yield fine marble, and emery is obtained in Naxos and other islands. Sulphur (about 600 tons a year) is mined in Melos and Santorini.

Agriculture. As cultivation depends largely upon irrigation, which is very unequally distributed, the tilled lands in most parts of the country resemble oases. Cereals occupy about half of the tilled lands, but wheat is among the imports, the home supply being inadequate. Rice is grown in the lowlands of Elis, and maize, barley, and oats are raised to some extent. The Greek currant (a small seedless grape), grown extensively on some of the Ionian Islands and near the gulfs of Patras and Corinth, is a large crop and the staple of agricultural exports. The vine is of first importance in Greek agriculture, the area in vineyards having increased from 125,000 acres in 1860 to 250,000 acres in 1900. While currants are the chief crop, the production of wine has increased and the quality has in later times improved. Being rich in alcohol and color, Greek wines are bought by many French merchants to mix with home vintages. As the Greeks live largely on vegetables and fruits, gardening is a great industry, well-tilled gardens being very numerous near the towns and on the plains. Flax, hemp, tobacco, cotton, and the mulberry-tree supply the industries with raw material. The cultivation of flax and hemp has decreased on account of Russian competition, but tobacco, yielding excellent leaf, is an increasing crop, particularly on the plains of Argolis and around the Gulf of Corinth. Mulberry plantations abound in the Peloponnesus and Eubœa, where raw silk is produced, both for home industry and export. Cotton is raised in the Peloponnesus, but finds the most congenial soil and climate in Thessaly and Bœotia. During the Turkish domination olive-growing steadily declined, as one method of punishing insurrection was to destroy the olive-trees. Since 1830, however, the planting has rapidly advanced, and olives are to-day one of the best resources of the Greek peasantry. The trees have increased from 2,000,000 to 13,000,000 since Greece won independence. Fruit-trees are important, above all in the Ionian Islands and the Ægean Archipelago, oranges, lemons, figs, and pomegranates leading in production. The most important domestic animals are sheep (2,900,000 in 1892) and goats, from whose milk butter and cheese are made. Goats are raised everywhere, but the large flocks of sheep are found mostly on the plains of Thessaly. Bee-culture is important and the honey of Hymettus is famous. The country abounds with fragrant flowers that give to honey a particularly delightful savor. While agriculture is the chief resource of the people, the prevailing poverty of the soil prevents it from being so large an element of prosperity as in many other countries; and an undue proportion of the peasants are attracted from labor in the fields to the life of the sailor. To a large extent the land is in the hands of the peasant proprietors, though there are some great estates, particularly in Thessaly. Of the total area there are 3,360,000 acres cultivated and fallow, 1,280,000 pasture, 1,900,000 forest, and 9,500,000 waste land.

Manufactures. Most of the common articles used in Greece are the product of home industry. Cloths and carpets are woven by peasant women in their houses, and the metal and leather goods industries employ thousands of men in their small shops. The poorer classes derive most of their manufactured articles from the home industries. The development of large industries is discouraged by the fact that Greece has neither coal, wood, water-power, nor adequate capital. Since 1870, however, the industrial arts have made important progress, and the Government does all in its power to stimulate manufacturing. The cotton cloths now produced in the factories of the Piræus and other centres supply most of the home needs, and are even exported to Turkey. The Piræus is the largest industrial centre. It has a number of cotton, silk, and wool factories, many flour-mills; it builds ships and makes alimentary pastes. Larissa is also prominent in the

cotton and silk industries. Sparta and Athens weave cheap silks, and Patras spins much cotton yarn. The metallurgic industries are little developed, though some machinery is made at Syra and a few other towns. The principal industries are those which transform agricultural and animal products into manufactured commodities, such as soap-works, tanneries, distilleries, and refineries. Sponge fisheries are actively carried on in the Ægean Sea and along the coasts of Tunis and Tripoli, and the preparation of sponges for market is a considerable industry. As the sea trade is largely developed, ships are built in all the ports, the industry being most active in Syra and the Piræus.

Commerce. The following figures show the average volume of the special trade of Greece (that is, the commerce exclusive of the forwarding trade):

	1879–83	1891–95	1900
Imports..	$24,500,000	$22,500,000	$25,900,000
Exports	13,500,000	17,000,000	20,400,000

The chief imports in 1900 were: Cereals, $6,720,000; cloth and yarn, $3,290,000; coal, etc., $2,990,000; wood and timber, $2,220,000; fish and caviar, $1,230,000; chemicals, $830,000; rawhides, $670,000; live stock, $670,000; paper, $670,000; coffee, $550,000; sugar, $510,000; glass and earthenware, $500,000. Currants are about one-half of the exports, and the only product for which there is considerable demand from many countries. The chief exports in 1900 were: Currants, $10,570,000; ores, $4,160,000; wine, $960,000; tobacco, $710,000; figs, $480,000; olive oil, $460,000; silk and cocoons, $280,000. Great Britain has the larger part both of the import and export trade, usually selling to Greece about one-third of her purchases (woven goods and yarns, coal, iron, and machinery), and buying from her about one-fourth of her sales (mainly currants, besides lead, iron, zinc and silver ores, raisins, sponges, and valonia). The influences of a common religious faith and the convenient communications between South Russian and Greek ports give Russia second place in the Greek trade; and Austria-Hungary, Turkey, Egypt, Germany, France, and Italy are the other most important buyers and sellers. The United States sold to Greece in 1900 goods valued at a little over $300,000, chiefly machinery, and bought from it commodities valued at about $1,000,000, chiefly currants.

Banks. The Ionian Bank, established in 1839, with headquarters in London, and the National Bank, dating from 1841, with which was incorporated the Epiro-Thessalian Bank in 1900, are the chief institutions of their kind in the country. There are numerous private banks, and since 1899 an agricultural bank has been in operation at Patras with the object of freeing agriculturists from the machinations of usurious money-lenders by lending money at a fair rate of interest on land security.

Transportation. As the sea is the main highway, both in the domestic and foreign trade, the completion of the Corinth Canal across the Isthmus of Corinth, in 1893, was a most important addition to commercial facilities. This canal, 3.7 miles long, connects the Ionian and Ægean seas, and gives a much shorter and smoother passage between Italy and Odessa and for all the small vessels plying between the ports of Northern and Central Greece than that around the south end of the country. The sea trade was served in 1900 by 137 steamers of 115,530 tons, and 927 sailing vessels of 183,877 tons. More than half the trade is carried through the port of Piræus. The Greek flag is more prominent than any other in the shipping trade of the eastern Mediterranean ports, and there are several thousands of small trading craft. The islands are the great centre of sea life. The little island of Syra, in the centre of the Cyclades, has long been the largest trader in the Ægean, though its importance has for some time been declining. A large part of the shipping of Greece belongs to the Ionian Islands. The railroads are as yet very inadequate for the needs of the country, only 603 miles having been in operation in 1900. The railroad, only partly built, between Athens and northern Thessaly, will be the trunk line of the country, with extensions into the Peloponnesus. It is intended to extend the line from Larissa to Saloniki, and thus bring Greece into rail communication with the rest of Europe. The common roads have been much improved, and there are now over 2000 miles of good highways.

Government. Greece is a constitutional monarchy, the kingship being vested in the royal House of Holstein-Sonderburg-Glücksburg, of which the present head is the King of Denmark, whose second son, George I. (Georgios), ascended the Greek throne in 1863. The legislative power is vested in a Chamber of Deputies (the Boulé), which meets annually in Athens, the members being elected by popular vote for a term of four years. The suffrage is restricted to males, twenty-one years old or over. Members of the Boulé, and all officials, must be at least thirty years of age. The executive functions of the State are in the hands of the six heads of departments, who compose the Ministry. Military service is compulsory for two years in the active army, and for ten years in the reserve. The army on a peace footing numbers 25,180, including officers and men; in time of war it is increased to 82,125. The fleet consists of 67 vessels, manned by 4042 officers and men. Besides three battle-ships and two other armor-clad ships, a cruiser, and a royal yacht, the navy includes coast-defense vessels, gunboats, and torpedo-boats. The average annual revenue is over $20,000,000, derived from the customs, stamps, monopolies (salt, petroleum, matches, and playing-cards), and the tobacco tax. The receipts much more than provide for the current expenses, but as the net proceeds of the monopolies and tobacco and stamp taxes are applied to diminishing the public debt, the budget usually shows a small deficit. The public debt in 1899 was $157,200,000, not including the paper money in circulation. The monetary unit is the drachma, equivalent to the franc. The gold coins of the leading countries are accepted, by royal decree, as legal tender. The metric system of weights and measures was introduced in 1898 and is gradually supplanting the old system.

Population and People. The population of Greece according to the census of 1896 was about 2,443,806. Only about one-third of the Greek people live in Greece. There are about 1,000,000 Greeks in Asia Minor, between 1,000,000 and 2,000,000 in European Turkey, about 500,000 in the Ottoman islands, Cyprus, and Crete, and

considerable numbers in other parts of the Old World, while thousands have come to the United States. Over 200,000 non-Greeks reside in Greece, of whom the Albanians, the most numerous body, are becoming largely assimilated with the native population. The Greeks surpass all the other peoples of the Balkan Peninsula in homogeneity and national unity, and in this way, as well as in commerce and navigation, have shown themselves to be worthy successors of the old Hellenes in spite of the misrule and other misfortunes which for centuries tended to impoverish the soil and decimate the population. Most of the people, as well as their government, are poor. It is foreign capital that has to a large extent made public improvements and brought about some development in manufacturing.

ETHNOLOGY. In racial characteristics the Greeks belong to the Mediterranean race, and are akin to the Iberian of Spain and the Ligurian of Italy. They are above the average in height (1.65 mm., or 5 feet 6 inches), dolichocephalic (index 75.7 to 83 according to mixture), with dark skin, hair, and eyes. The face is a long oval, and the features are most attractive. Where those of shorter skulls or lighter color have crept in, the effect is seen in the population. Slavs, Avars, Turks (Ural-Altaic), and Albanians (Adriatic or Dinaric race) have invaded Greece and added their racial characters to those of the older population. The Greeks of classic times were of the long-headed Mediterranean type, as the crania that have been recovered show, though their statuary, as is pointed out by Stephanos, is brachycephalic. In speaking of the ancient inhabitants two names stand out prominently for recognition, that of the Hellenes and that of the Pelasgians. Relying chiefly on the testimony of Herodotus, Sergi places the Pelasgians in the great Mediterranean family, where, before Greece was Hellenized, they completed the circle formed else by Iberians, Ligurians, and Libyans. This aboriginal Pelasgian stock was Hellenized afterwards, just as the inhabitants of Gaul and Spain were Latinized. Behind the classic age lay the age of bronze and the age of stone. But the scarcity of osteological material renders it impossible to form opinions on the race of the men who peopled them.

In Ætolia, Acarnania, Thessaly, the greater part of the Peloponnesus, and most of the islands, the descendants of the old Greeks are still predominant; but a very large admixture of Albanians (see ALBANIA) prevails in Attica, Bœotia, Phocis, and Argolis, with the islands of Spezzia, Salamis, Hydra, and Andros. The true Greek is easily recognized by his tall stature, slim body, aquiline nose, oval face, and mustache, the beard being worn only in mourning. The Greeks are temperate in both eating and drinking; flesh is seldom eaten so that the diet is principally vegetable. The Greeks are devotedly attached to their fatherland, and their love of liberty and independence is strong. Though they are loyal to a good ruler, they are easily roused to resistance by the infringement of their rights. Commercial bargains are the delight of the Greeks. Early marriages are common, and the Greek matrons take pride in large families. Two peculiar branches of the Greek race are the Mainotes of the Peloponnesus and the Palikars of the northern highlands. The former, who boast to be the descendants of the ancient Spartans, inhabit principally the mountain fastnesses of Taygetus, where for centuries they defied the power of the Turks. In recent times education, intermixture with other races, and commerce have to a great extent removed their distinctive peculiarities. The red cap, the white shirt, and the golden jacket mark out the Palikars even to the casual observer as a separate class. They go about armed, and attended by armed followers; their houses are fortresses, and their servants form a little army. The islanders are almost all seamen or traders; they wear the red cap, a short jacket, and wide Turkish trousers. The Albanians are a strong, hardy race, and engage in agriculture or other severe labor. The Wallachs, of whom there are a considerable number in the region of the Pendus, are a nomad and pastoral race; they sleep on the hillsides with their flocks, which are guarded by ferocious dogs. There are large numbers of Maltese at Athens, and especially the Piræus. The settlers from Western Europe are not numerous. There is a considerable Turkish element in Thessaly.

RELIGION. The predominant religious faith is Orthodox Greek, which is the State religion, though the fullest liberty is given to all sects. The ecclesiastical authority of the Greek Church is no longer vested in the Patriarch at Constantinople, but in a council known as the Holy Synod, under the presidency of the Metropolitan of Athens. The Christian sects, other than Greek, number about 25,000; Jews, 6000; and Mohammedans, 25,000. See GREEK RELIGION (ancient); and GREEK CHURCH.

EDUCATION. During the fifth and fourth centuries B.C. the education of the Greek boy was divided into three branches. (1) *Gymnastics* (*γυμναστική*), including all forms of physical training, wrestling, running, leaping, etc., taught by a trainer (*παιδοτρίβης*), at a *palæstra*. (2) Grammar (*γραμματική*), including reading, writing, and the elements of numbers. In this school the boy learned by heart many of the ancient poets, and studied carefully their works. (3) Music (*μουσική*), an essential part of a Greek liberal education, including singing and playing on the lyre. This training lasted from about the sixth to the eighteenth year. Further training in philosophy and rhetoric was in the hands of the Sophists (q.v.). The boy was accompanied to and from school, and in his exercise, by a pedagogue, who was not a teacher, but merely a slave, who had general oversight over the boy and could punish him if necessary. In later times other branches, notably geometry, were added to the usual training, and in some places schools were provided by the city for boys and even girls. For the education of the youth by the State, see EPHEBUS.

In modern days education from the humblest school to the university is free to all. Ignorance, however, is rife in the rural districts, where the law requiring all children to attend school is not well enforced. Education is upon a somewhat higher plane among the islands than on the mainland. The school system is only partly supported by the Government, being largely dependent upon private contributions. Only 15 per cent. of the army recruits can read. Education is in a more flourishing condition in the higher schools, and the University of Athens, with 2853 students in 1900, attracts over 800 students from other Medi-

terranean countries, chiefly from Turkey. There are also a polytechnic and two agricultural schools, a military academy, and several naval schools.

BIBLIOGRAPHY. Schmidt, *Beiträge zur physikalischen Geographie von Griechenland* (Leipzig, 1864-70); Brockhaus, *Griechenland, geographisch, geschichtlich, kulturhistorisch, von den ältesten Zeiten bis auf die Gegenwart dargestellt* (Leipzig, 1870); Finlay, *History of Greece* (Oxford, 1877); Reclus, *Géographie universelle*, vol. i. (Paris, 1877); Jebb, *Modern Greece* (London, 1880); Wordsworth, *Greece: Pictorial, Descriptive, and Historical* (London, 1882); Bent, *The Cyclades* (London, 1885); Hanson, *The Land of Greece* (London, 1885); Cheston, *Greece in 1887* (London, 1887); Mahaffy, *Rambles and Studies in Greece* (3d ed., London, 1897); Hermann, *Lehrbuch der griechischen Staatsaltertümer* (Freiburg, 1889); Rodd, *The Customs and Lore of Modern Greece* (London, 1892); Freeman, *Studies of Travel in Greece and Italy* (New York, 1893); Samuelson, *Greece: Present Condition and Recent Progress* (London, 1894); Janeway, *Glimpses at Greece* (London, 1897); Sergeant, *Greece in the Nineteenth Century* (London, 1897); Seignobos, *Histoire politique de l'Europe contemporaine* (Paris, 1897); Pausanias, *Description of Greece*, translated by Frazer (6 vols., New York, 1898); Lavisse, *Histoire générale*, vol. x. (Paris, 1898); Symonds, *Sketches and Studies in Italy and Greece* (London, 1898); de Halásfy, *Conspectus Floræ Græcæ* (Leipzig, 1900); Philipson, "Beiträge zur Kenntniss der griechischen Inselwelt," in *Petermanns Mitteilungen*, No. cxxxiv. (Gotha, 1901); Guillaume, *Grèce contemporaine* (Brussels, 1901). Consult also on the ethnology: Montelius, "Die Bronzezeit im Orient und in Griechenland," in *Archiv für Anthropologie*, vol. xxi. (Brunswick, 1892); Virchow, *Ueber griechische Schädel aus alter und neuer Zeit* (Berlin, 1893); Cara, *Gli Hethei Pelasgi* (Roma, 1894); Stephanos, "La Grèce au point de vue naturel, ethnologique, anthropologique, démographique," in *Dictionnaire encyclopédique des sciences médicales* (Paris, 1884); and on education in ancient Greece: Mahaffy, *Old Greek Education* (London, 1881); Grasberger, *Erziehung und Unterricht im klassischen Altertum* (Würzburg, 1864-81); Girard, *L'éducation athénienne* (Paris, 1891).

HISTORY.

ANCIENT HISTORY. (See paragraph in this article under *Ethnology*.) The Hellenes, or later inhabitants of Greece, were a branch of the Indo-European, also called Indo-Germanic or Aryan, speech-family. They are supposed to have entered the country at a remote period from the north and northeast in successive waves of migration, and were composed of various independent tribes. It was not until after the time of Homer that they received the common name Hellenes. By Homer they are called Danaäns, Argives, and Achæans, while the Hellenes were in his time a small tribe in Thessaly. The name 'Greeks' was another tribal name, generalized by the Italians. The early history of the Greeks is one of fable, wherein the achievements of centuries are compressed into single generations, and the movements of whole peoples are described as the adventures of heroes. To this so-called Heroic Age belong the deeds associated with such names as Heracles, Theseus, and Perseus, and the great undertakings known as the Argonautic Expedition, the Expedition of the Seven against Thebes, and the Siege of Troy. Much light is thrown upon the civilization of the early period by the remains found at Mycenæ, Tiryns, and other places. (See ARCHÆOLOGY.)

The first truly historical landmark in the history of Greece is offered by the so-called Dorian migration. The waves of migration which as early as the stone age had peopled Greece with the tribes from the north were continued from time to time after the country had been occupied. One such wave was that of the Dorians, who, at some time roughly placed between B.C. 1200 and 1000, descending from their mountainous home in the central part of Northern Greece, overran the Peloponnesus and enslaved or drove out the former inhabitants of the land. One of these displaced tribes, the Achæans, settled on the southern shore of the Corinthian Gulf, expelling the Ionians, who took refuge in Attica. The story of these migrations is compressed into a single generation, but it doubtless represents the conquests of at least two or three centuries. One of the effects of the movement was the colonization by Greeks of the lands farther east—the islands of the Ægean Sea and the coast of Asia Minor. The expelled peoples were obliged to seek new homes, and three important streams of colonization poured across the sea: the Æolians, so called, who settled the islands and coastland to the north; the Ionians, who settled the islands of the central Ægean and the middle portion of the Asiatic coast; and the Dorians farther south, who occupied Crete and other islands and the southwestern coast of Asia Minor. Several centuries later, in the eighth and seventh centuries B.C., another great colonizing impulse spread through the Grecian lands; the cause of this impulse, however, was not external pressure, but internal expansion. This movement carried Greek civilization to Sicily, South Italy (Magna Græcia), Africa, and other regions.

The history of Greece is for the most part one of individual States, each fired with the spirit of independence and the desire for freedom, and each seeking to solve the problem of national development in its own way and according to its own impulses. The two States which became most prominent, and with which history has principally to do, are Athens and Sparta. Sparta from early times held the lead in the Peloponnesus, where Argos was long her rival. In the seventh century B.C. she subdued Messenia. Her peculiar political and social institutions are ascribed to the lawgiver Lycurgus, who, according to the common tradition, lived in the ninth century B.C. At the head of the Government were two hereditary kings; but their power was limited, and in historical times was confined to certain priestly functions, the command of the army in war and the enjoyment of a position of honorary distinction in the State. The actual power was vested in the ephori (q.v.).

The development of the Athenian political system was carried further than that of the Spartan system. The regular course of political history in the Greek States was this: The kingly form of government, which was prevalent in the Heroic Age, gave place at a later time to an oligarchy of birth; this in turn became transformed into a one-man power, or 'tyranny'; and the 'tyranny'

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was finally replaced by a government of the people, or democracy. The history of Athens illustrates this course of development, and the names of Solon (archon, B.C. 594), Clisthenes (about 508 B.C.), and Pericles (in the last half of the fifth century B.C.) are landmarks in the development of the Athenian democracy. Pisistratus and his sons (B.C. 560-510) mark the period of 'tyranny.' The chief officers and bodies of the Athenian democracy were the nine archons, the Areopagus, the Senate, the Ecclesia, or public assembly, and the Heleæa, or law courts. By the side of Athens, Sparta, and Argos, Corinth early rose to prominence, developing into a great industrial, commercial, and colonizing centre.

The Greek settlements in Asia Minor were conquered by Crœsus, King of Lydia, in the early part of his reign (B.C. 560-546), and brought within the Lydian kingdom. In B.C. 546 Crœsus was overthrown by Cyrus the Great, King of Persia, and the Greek cities in Asia, as well as the islands along the coast, with the exception of Samos, were made subject to the Persians. In B.C. 500 the Ionians revolted against the Persian rule and were assisted by twenty Athenian and five Eretrian ships. Sardis, the capital of Lydia, was taken, sacked, and burned. The ire of Darius, the Persian King, was aroused, and he vowed vengeance both on his revolted subjects and on their supporters from across the sea. In B.C. 493 the rebellion was brought to an end, and in the following year Mardonius, son-in-law of Darius, was sent to Greece to take vengeance on the Athenians and the Eretrians. Three hundred ships and 20,000 men were lost in a storm off Mount Athos, and Mardonius himself, who led an army by land, was so harassed by the tribes of Thrace that he was obliged to turn back. Two years later, in B.C. 490, a second expedition, consisting, according to ancient authorities, of 600 galleys, 100,000 foot and 10,000 horse, was sent across the Ægean, under the command of Datis and Artaphernes. After taking the city of Eretria, the Persians proceeded, under the guidance of the aged Hippias, to the plain of Marathon, 22 miles northeast of Athens. In the battle which there took place, 10,000 Athenians were assisted by 1000 heavy-armed soldiers and a few light-armed troops from Platæa. A messenger had been sent for aid to Sparta, but, from a religious superstition, the Spartans were prevented from marching for five days, and the crisis was then past. The Greeks, led by Miltiades, were overwhelmingly victorious; 6400 Persians were lost, while only 192 Athenians were killed. In the following year Athens found herself at war with Ægina. This war taught her the necessity of having a navy, and she was induced by Themistocles to construct a fleet of 200 vessels, and to add 20 new vessels thereto every year. In the meantime, Xerxes, the Persian King, was preparing for an invasion of Greece on a grand scale. Troops and supplies were brought together from every quarter of his Empire, until the largest army of which history has a record was assembled. A bridge of boats was thrown across the Hellespont for the convenience of the land troops, a canal was cut through the neck of the peninsula of Athos for the passage of the ships, and in the spring of B.C. 480 the force was set in motion. The first stand was made by the Greeks at Thermopylæ. The pass was heroically defended by Leonidas and his 300 Spartans, but was finally taken through the treachery of a Greek. Athens was captured and burned, having been, at the approach of the Persians, abandoned by its inhabitants. In the meantime the Persian fleet, after undergoing severe losses in storms and in battle at Artemisium, off the northern end of the island of Eubœa, proceeded to Salamis in pursuit of the Greek fleet. The number of the Persian vessels at Salamis was about 1200; that of the Greeks less than 400, 200 of which were Athenian. In the battle which took place in the narrow strait between the island and the mainland, and which Xerxes viewed from a golden throne erected on the slope of Mount Ægaleus, the Persians were completely defeated. Xerxes fled in alarm to Asia, leaving Mardonius with 350,000 men to bring the war to a close. In the following year (B.C. 479) Mardonius was overwhelmed by 110,000 Greeks, under Pausanias, at Platæa and slain, and on the same day another Persian army was defeated, with loss of its fleet, at Mycale in Asia.

Athens was now, as a result of her patriotism and sacrifices, the first State in Greece, and her position was still further strengthened by the events that followed the Persian wars. The treachery of Pausanias, the commander-in-chief of the combined Athenian and Spartan fleet which was engaged in driving the Persians from the Greek cities in the Ægean and in the neighborhood of the Hellespont, caused the fleet to put itself under the leadership of the Athenian commanders, and in B.C. 476 was formed the Confederacy of Delos, on which the future empire of Athens was to be built. This Confederacy was a voluntary coalition of Greek States formed for the purpose of prosecuting the war with Persia and driving the Persian power from the Ægean Sea and the lands washed thereby. The delegates were to meet yearly on the island of Delos, and there was also to be the treasury. A fixed contribution in ships or money was assessed on each State. Gradual changes were, as time went on, wrought in the relation of the allies to one another, and the alliance of equal independent members was at length transformed into an empire of dependent States, with Athens at the head.

The period between B.C. 479 and 431, the year of the beginning of the Peloponnesian War, was the most brilliant in the history of Athens. The latter part of this period, called the age of Pericles, saw the complete democratization of the Athenian constitution. The Long Walls, connecting Athens with the port of Piræus, were now built, the city was beautified with many public buildings, the Propylæa, the Parthenon, the Theseum, and others, and sculpture, art, and literature flourished. But irritation at the oppression of Athenian control, and the old spirit of independence, which always stood in the way of Greek unity, were silently at work; the height of Athenian power is marked by the battle of Œnophyta (B.C. 456) and the conquest of Bœotia; in B.C. 447 Bœotia revolted and the Athenians were defeated at Coronea. By the treaty which was then made, the Athenians engaged not to interfere further in Bœotian affairs, and by the Thirty Years' Truce, concluded two years later (B.C. 445), they acknowledged the leadership of Sparta in all Peloponnesian matters.

The situation of affairs in Greece at the time

of which we are speaking was as follows: On one side was Athens, with her empire of subject and mostly discontented allies, comprising all the coast cities of Asia Minor as far south as Lycia, the cities along the Thracian and Chalcidian shores, and nearly all the islands of the Ægean; and on the other, Sparta, with her voluntary confederacy of free and independent States, among which were numbered nearly all the States of the Peloponnesus, some in Northern Greece, and those of Italy and Sicily. Athens was a maritime power, with an efficient navy of 300 galleys; Sparta was preëminently a land power. Athens had a full treasury and a large annual revenue; Sparta was financially weak. Athens was democratic and progressive; Sparta was aristocratic and conservative. It was inevitable that the question of supremacy should at some time come to an issue between these two. The struggle was precipitated by the contentions between Corinth and her colony Corcyra, and the revolt of Potidæa from the Delian League. The war which now broke out in B.C. 431, which is known as the Peloponnesian War, lasted until B.C. 404, and resulted in the complete abasement of Athenian pride and the establishment of Spartan supremacy. It may be divided into three periods: (1) from the beginning to the Peace of Nicias (B.C. 421); (2) from the Peace of Nicias to the Sicilian Expedition (B.C. 415); (3) from the Sicilian Expedition to the end (B.C. 404). The most important events of the first period were the surprise of Platæa by the Thebans (B.C. 431), the fall of Mitylene (B.C. 427), the capture of Platæa by the Spartans (B.C. 427), the siege and capture of Sphacteria by the Athenians (B.C. 425), and the defeat of the Athenians by the Spartans at Amphipolis (B.C. 422). The Peace of Nicias, which was a peace in name but not in fact, left the two contending parties in practically the same relative position as before the war. In the second period there was more or less fighting between the different States of Greece, but no great battle. The ill-advised Sicilian Expedition (B.C. 415-413) portended the ultimate result of the long contest; it left Athens broken and exhausted. The battle at the Arginusæ (B.C. 406) was an Athenian victory, but the capture of the Athenian ships at Ægospotami in B.C. 405 put an end to the war. Athens surrendered to the Spartan commander, Lysander, her walls were demolished, her ships were given up, she was deprived of her foreign possessions, and an oligarchical government was established in the city.

The body which was now set up at Athens consisted of thirty members, and was known as the Thirty Tyrants. Similar bodies of ten were everywhere established by Lysander in the democratically ruled cities of Asia Minor and the islands. It soon became apparent, to those who had chafed under Athenian rule, that the rule of Sparta was destined to be much more harsh and oppressive than that of Athens had been. A change of feeling took place in many quarters. The Athenian exiles, joining under the lead of Thrasybulus, seized the fort of Phyle, a few miles north of Athens, entered the Piræus, defeated in battle the forces of the Thirty, and secured the deposition of the Thirty and the appointment of a Council of Ten in their stead. These were later replaced by another board of ten, and a reconciliation was effected. The democracy was restored (B.C. 403) sixteen months after Lysander had taken Athens.

The period of Spartan supremacy extended from the close of the Peloponnesian War to the battle of Leuctra, in B.C. 371. In B.C. 399 war broke out between Sparta and Persia, and in B.C. 397 Agesilaus, the King of Sparta, was sent to Asia to bring it to an end. He met with success and was about to carry the war into the interior of Asia, when he was called home to oppose a coalition of Greek States which had been formed against Sparta. The struggle that ensued is known as the Corinthian War. In B.C. 395 Lysander was defeated and slain by the Thebans at Haliartus. The allies were defeated by Agesilaus at Coronea in B.C. 394, but in the same year the Lacedæmonian fleet was defeated by Conon and Pharnabazus at Cnidus. Conon, returning to Athens, restored the fortifications of the Piræus and the Long Walls. The Corinthian War was continued in a petty way, and with varying fortune, until in B.C. 387 Sparta, through the mediation of Persia, imposed upon the Grecian States the disgraceful Peace of Antalcidas, in which the interests of the Asiatic Greeks were sacrificed. Five years later, in B.C. 382, Sparta treacherously seized the citadel of Thebes and overcame the Chalcidian city of Olynthus. Thebes was soon freed again by the Theban patriot Pelopidas, and fighting was resumed between Athens, supporting Thebes, and Sparta, which was concluded in B.C. 371 by the Peace of Callias. Thebes refused to sign the treaty, and the Spartans invaded Bœotia. The issue was determined by the battle of Leuctra (B.C. 371), in which the Thebans, led by Epaminondas, thoroughly defeated the Spartans.

The period of Theban supremacy, which now began, lasted nearly ten years, to the battle of Mantinea, in B.C. 362, and was the supremacy principally of one man, Epaminondas. Democracy was once more predominant. The Peloponnesus was invaded, Arcadia was formed into one State, with a new city, Megalopolis, as the head, and Messenia was made independent of Sparta. Athens united with Sparta in resisting Thebes, and in the battle of Mantinea (B.C. 362), though the Thebans were victorious, Epaminondas was killed. Athens now tried to reëstablish her empire over her former allies, but without success; the Social War (c.357-355 B.C.) secured the independence of nearly all the States.

In the meantime there was coming into prominence north of Greece a new power, which was destined to absorb within itself all the Grecian lands. This power was that of the Macedonians, a race akin to the Greeks, but looked upon as barbarian. Philip, the son of Amyntas II., became King of Macedonia in B.C. 359, and, after establishing himself firmly on his throne, at once proceeded to annex the Greek colonies on the coast of Macedonia and Thrace. One by one they fell into his hands—Amphipolis, Pydna, Potidæa, Methone, and the others. He next took steps to gain a footing in Greece, and the opportunity was offered him by the Sacred War between Thebes and Phocis, which broke out about B.C. 357. The Amphictyonic Council influenced by Thebes, inflicted a heavy fine on the Phocians for having tilled certain waste ground belonging to Apollo, and the latter obtained the support of the tyrants of Pheræ in Thessaly. Thereupon the noble Thessalians invited Philip to enter Greece

and lend them his aid, an invitation he was only too ready to accept. Entering Thessaly, he went as far south as Thermopylæ, but was there met by an Athenian force and prevented from proceeding farther. Returning to Thrace, and continuing his conquests in that direction, he in B.C. 347 took the Chalcidian town of Olynthus, and soon after the whole Chalcidian peninsula fell into his hands. Though opposed by a party at Athens, led by the orator Demosthenes, he advanced almost unchecked, accomplishing as much by bribery and deception as by force of arms. He received at the hands of the Amphictyons the two votes in their assembly to which the Phocians had been entitled, but of which they had been deprived, and also a share in the presidency of the Pythian Games. Being once more invited into Greece, this time by the Amphictyons to take part against the Locrians, he advanced into Bœotia, and was met by the Bœotians and Athenians at Chæronea B.C. 338; this battle was a victory for Philip and the death-knell of Grecian independence. A congress of Greek States, held at Corinth in the next year, recognized Macedonian supremacy in Greece, and appointed Philip commander-in-chief of the Greek forces. Philip immediately began preparations for invading Persia, but was assassinated in B.C. 336, and his son, Alexander, twenty years of age, succeeded him.

At the death of Philip a general rising against the power of Macedonia was threatened, but it was quickly suppressed by the energy of the new King. Having made an example of Thebes, which he razed to the ground, he set out in B.C. 334 on his famous invasion of Persia. The conquests of Alexander in the East extended Grecian influence and Grecian civilization and language throughout a great part of Asia. He founded Alexandria, which, under the Greek dynasty of the Ptolemies, soon rose to be the greatest centre of civilization in the world. Alexander died at Babylon in B.C. 323, and his empire was divided among his generals. Among those who shared in this partition of power were Perdiccas, Antipater, Crateras, Antigonus, Eumenes, Ptolemy Lagi, Lysimachus, Polysperchon, Cassander, Seleucus, and Demetrius Poliorcetes. Of the States established by the successors of Alexander, the so-called Diadochi, the most important were the Greek Kingdom of Egypt (the realm of the Ptolemies) and the Kingdom of Syria (the realm of the Seleucidæ). Later the Kingdom of Pontus rose to great power under the Greek dynasty. An effort was made by Greece to throw off the yoke of Macedonia, and the war, called the Lamian War, was ended by the victory of Antipater, Regent of Macedonia, at Crannon in B.C. 322. In the wars of the successors of Alexander, Greece was often the battlefield of the contending forces. Two attempts were made in this period at federation. The Achæan League was formed about B.C. 280, and included Athens and other cities of Northern Greece, and Corinth, as well as much of the Peloponnesus. The abilities and patriotism of Aratus and Philopœmen (the latter styled the 'last of the Greeks') shed lustre upon this confederacy, which for many years maintained the cause of Grecian independence against foreign conquerors. The Ætolian League was formed in Central Greece, but was less famous than the Achæan. In B.C. 197 Philip V. of Macedon was defeated at Cynocephalæ by the Romans, and in B.C. 196 the freedom of Greece was proclaimed by the victorious general Flamininus at Corinth. In B.C. 168, by the battle of Pydna, and in B.C. 146, with the destruction of Corinth by the Roman general Mummius, Greece passed completely into the hands of the Romans, who made of it a province, under the name of Achaia.

FOREIGN RULE. From the completion of the Roman conquest by the capture of Corinth in B.C. 146 until the outbreak of the Mithradatic wars in B.C. 88 Greece enjoyed a just and wise administration under the Romans, and the country prospered. The nationalist revolt which followed the first successes of Mithradates against the Romans changed these conditions. Athens was sacked by the forces of Sulla in B.C. 86, and Thebes was reduced in the following year. The hand of Rome fell heavily upon the rebellious cities, and that decline began from which the country never recovered. Under the emperors Greece enjoyed renewed tranquillity, its supremacy in thought and letters was recognized, and there was a partial return to prosperity. The Emperor Hadrian and Atticus Herodes (q.v.), the friend of the Antonine emperors, did much to restore the splendor of the ancient civilization. In the middle of the third century A.D. this condition was disturbed by the Gothic hordes, which overran the peninsula, captured Athens, and laid waste the cities of Argos, Corinth, and Sparta. Christianity, after the third century, spread rapidly in Greece in spite of the opposition it had to meet from the philosophers of Athens, which to the end remained the centre of pagan culture. When the world-empire founded by the Romans fell to pieces before the attacks of the northern barbarians, the eastern half, which embraced all that was Greek, continued its existence as the Byzantine or Greek Empire. But this Greek Empire, with its seat at Constantinople, which outlived the Western Empire by a thousand years, until it was extinguished by the Turks in 1453, was the mixed Oriental Greece, not that classic Hellas that had been the bulwark of the Western world. (See BYZANTINE EMPIRE.) The life of the true Greece was obscured for several centuries, only appearing as the peninsula became an object of conquest or an arena of strife. Before the final division of the Roman Empire, the rulers of Rome attempted to Romanize the East by introducing into the language of the period a mingling of Latin and Greek, known as Romaic; but they failed to overcome the strong race characteristics of the people. From the sixth to the eighth century, Slavic peoples from the north crowded into the Balkan Peninsula, occupying almost exclusively the ancient Peloponnesus. The invaders were merged to some extent with the ancient race, and remained in occupancy of Illyria and Thrace, producing a mixture of nationalities which constitutes at the present day one of the chief elements of confusion in the puzzling problems of the Balkan Peninsula. The ambition of the Frankish leaders of the Fourth Crusade and the greed of Venice interrupted the continuity of Byzantine rule, establishing the short-lived Latin Empire of the East (1204-1261), and dividing the Hellenic Peninsula into a number of feudal fiefs, of which the Duchy of Athens was the most prominent and the longest lived. Held for a century (1205-1308) by the Frankish House of De la Roche, then for a few years by that of Brienne, the duchy became after the conquest by the Catalan Grand Company (q.v.), in 1311, an

appanage of the Kingdom of Aragon. In 1385 it was acquired by the Florentine family of Acciajuoli, under whom it remained until the Turkish conquest in 1456. During this period the Court of Athens was one of the most brilliant of the feudal courts of Europe. Soon after the capture of Constantinople in 1453, Mohammed II. turned his attention to the Morea and Attica, and by 1460 they had been completely subjugated. The Turkish conquest, sending thousands of Greeks into exile, spread the intellectual influence of the race through the West, and promoted the revival of learning in Europe. (See RENAISSANCE.) The Venetians still held many places in the Grecian islands, and defended them obstinately in an almost constant series of wars until 1718; but gradually the islands, like the mainland, fell into the hands of the Turks. The great naval battle of Lepanto (Naupactus), won by the allied Papal, Spanish, and Venetian fleets, October 7, 1571, gave the Christian powers a temporary advantage which they failed to follow up. Venice lost Crete in 1669, but in 1684 the Venetian Admiral Morosini opened a vigorous campaign, which resulted in 1687 in the conquest of the Morea and of Attica. During the siege of Athens (1687) the Parthenon was ruined by the Venetian bombardment. The peace of Carlowitz in 1699 left the Morea alone in the possession of Venice; and in 1715 this was again conquered by the Turks, after a feeble defense, and by the Peace of Passarowitz (1718) the Ottoman Empire remained in full possession of Greece. The country was administered in the usual Turkish fashion. It was divided into pashalics, within which the pashas ruled autocratically, being held accountable only for a certain amount of revenue, which they wrung from the unfortunate people. The same was true of officials of lesser rank, beys and agas, within the districts intrusted to them. Prostrated under an alien and irresponsible tyranny, the country lapsed into anarchy and poverty. All over Greece many of the more vigorous and independent of the people adopted the wild, free life of *klephts* or brigands, having their lairs in the mountains, and waging unceasing warfare against the Turks. Among them the spirit of independence was kept alive, although with a total disregard for authority. Terrible as was the rule of the Turks, they allowed two institutions to exist which acted as powerful forces toward maintaining intact the nationality of the Greeks. One was the Greek Church, the other the system of local self-government. In the eighteenth century Russia sought to extend a helping hand to the Greeks, her coreligionists, but little of moment was achieved. Large numbers of Greeks found a field for their activity in commerce and navigation, and this preserved the national life from stagnation and kept the people in touch with the outside world. Those who resided in foreign countries under freer governments, many of whom acquired wealth and influence, remained devoted to the fatherland and fostered the spirit of independence by helping to establish national institutions of learning. At the close of the eighteenth century the trade of the ports of Greece and of the Grecian islands assumed great proportions, and the merchant marine became a school whence was to issue a large array of naval heroes.

THE WAR FOR INDEPENDENCE. At the beginning of the nineteenth century the Greeks everywhere began to plan for a national revival, the chief agent being a great secret association, the *Hetæria*, which extended wherever in the world Greeks were to be found loyal to the national cause. The way for such a movement had been prepared by the labors of the patriot scholar Coray (q.v.), who had devoted himself to the task of restoring the classic language of ancient Hellas, with the conscious purpose of effecting thereby a resurrection also of the old national spirit. In March, 1821, at Jassy, the capital of Moldavia, Alexander Ypsilanti, head of the *Hetæria*, raised the standard of revolt, proclaiming the independence of the Greek people, and the ten years' struggle was opened. Ypsilanti's daring deed soon ended in disaster, but it was the signal for a great uprising, which at once began in the Morea. The Porte sought to check the revolt by wholesale massacres and executions, but the rebellion grew in spite of constant defeat. The people revived the memories of the ancient Greeks by their heroic deeds, on land and sea, under the lead of such men as Germanos, Kolokotronis, Mavromichalis, Demetrius, Ypsilanti, Mavrokordatos, Bozzaris, Odysseus, Miaulis, and Kanaris. Tripolitza, in the Morea, the capital of that pashalic, was captured by the Greeks, October 17, 1821. At Epidaurus in January, 1822, the first National Assembly framed a constitution. In March occurred the terrible massacres perpetrated by the Turks on the island of Scio (Chios), when about 25,000 people were slain within a month, and thousands more were sold into slavery. In spite of these atrocities, however, the members of the Holy Alliance, at the Congress of Verona in the last months of 1822, called upon the rebellious Greeks to return to their obedience. Among the deeds of the patriots in the year 1822 was the destruction of the Admiral's ship of the Turks at Chios (night of June 18-19), and of another vessel of the line (in November) by the fire-ships of Kanaris, and the victories of Kolotronis over the invading Turkish army in the Morea. In August, 1823, occurred the brilliant exploit of Marco Bozzaris (q.v.) at Karpenisi near Missolonghi. Funds to aid the patriots were obtainable only on exorbitant terms, but the generous contributions of wealthy Greeks and of sympathetic foreigners (see PHILHELLENES) maintained the long struggle against fearful odds. Among those who stirred up Europe in the cause of Greek independence was Byron. The Sultan at last called in Mehemet Ali (q.v.), who had already made a sinister reputation in Egypt, to suppress the rebellion. An Egyptian army of 17,000 men under Ibrahim Pasha landed in the Morea in February (1825). Navarino was taken in May, Tripolitza in June, and within half a year the entire peninsula had been subjugated. In April, 1826, the Turks took Missolonghi, after an heroic defense on the part of the Greeks, and on August 15th Athens was taken by storm. The misfortunes of the Greeks during this period of the war were due in great measure to the dissensions between the Constitutional Party, headed by Mavrokordatos and Kunduriotis, and the supporters of a military dictatorship, of whom the most prominent were Kolokotronis and Ypsilanti. A temporary reconciliation between the two parties was effected in 1827, and in March the National Assembly at Trœzen amended the Constitution so as to provide for a single executive. Count Capo d'Istria (q.v.) was chosen Presi-

dent, and assumed the government at the beginning of 1828. Party quarrels, however, broke out again almost immediately. On June 5, 1827, the Greek garrison in the Acropolis of Athens, which had held out after the lower town was taken, capitulated. The Greek cause seemed in a most deplorable condition; but the probable results of Turkish success in strengthening the power of Mehemet Ali in Egypt stirred the European cabinets at last to intervention. The London protocol of July 6, 1827, signed by England, France, and Russia, called for an armistice and intervention. The Porte, still supported by Austria, refusing to hear from the Powers on the subject, the allies strengthened their naval forces in the Mediterranean. The defiant action of Ibrahim Pasha precipitated the desperate battle in the Bay of Navarino, October 20th, in which the combined Egyptian and Turkish fleet was practically destroyed by a much lighter force. Soon after a French force landed in the Morea, and Ibrahim Pasha found himself compelled to withdraw his army. The onslaught made by Russia upon the Ottoman Empire in 1828-29 finally forced the Porte to accept a settlement proposed by the Powers. In the Treaty of Adrianople (q.v.) between Turkey and Russia, September 14, 1829, the Porte pledged its consent to whatever arrangements the Powers might conclude in respect to Greece. The London Protocol of the Great Powers, in February, 1830, declared Greece an independent kingdom, and was accepted by the Porte. In that country meanwhile the cessation of war had been followed by a period of great unrest. Great dissatisfaction was felt with the course adopted by Capo d'Istria in neglecting to call the popular assembly, and in ruling after the manner of a dictator. Capo d'Istria was assassinated October 9, 1831, in Nauplia, and Greece was for a short time ruled by a regency of seven men. On May 7, 1832, after long negotiations with various foreign princes, Otho, the second son of King Louis I. of Bavaria, was made King by the Powers, and landed in Greece early in the following year. The reorganization of the country was undertaken under a Bavarian regency, the King being only seventeen years of age. A loan of 60,000,000 francs was guaranteed by the Powers. King Otho came of age in 1835, and in the same year the seat of government was transferred from Nauplia to Athens.

Recent History. The Greeks from their earliest history have been devoted to constitutional government and to the principle of popular participation in the political life of the State. This was denied to them under the Bavarian rule, constitutions being frowned upon by the Continental Powers at that time. Thus the Government was out of touch with the people, and the discontent was increased by the faulty administration of the finances, which burdened the country with unprofitable taxation. England and France urged upon King Otho the advisability of giving the people a constitution, but he delayed until the revolution was already under way. This broke out in a bloodless way at Athens, September 15, 1843, and the King was compelled to yield. The new Constitution, however, did not restore the local self-government so dear to the Greek, nor satisfy the aspirations of the people. At the opening of the war between Russia and Turkey in 1853 Greece prepared to invade Turkey, hoping that the time had come to recover the Hellenic heritage. To prevent any alliance between Greece and Russia, French and English forces landed at the Piræus in 1854, and remained in occupation until 1857. This incident increased the national discontent with the King and his Government. The popular feeling, stimulated by the example of a regenerated Italy, took revolutionary form in 1862. In February the garrison at Nauplia revolted, and that of Athens followed in October. Otho was deposed, and, failing to obtain the support of the Powers, was compelled to leave the country. The choice for a new sovereign finally fell upon the second son of the King of Denmark, who became King of Greece as George I. The choice being acceptable to England, that country ceded to the new monarch the seven Ionian Islands, which since 1815 had constituted a republic under a British protectorate. This was an important accession, as the islands were prosperous and had constantly desired reunion with Greece. By the Constitution of 1864 the legislative functions of government were vested in the *Boulé*, comprising a single chamber, elected by universal suffrage for a term of four years. So demoralizing had been the experience of the country that brigandage was not suppressed until 1870.

Perhaps the greatest national aim of the constitutional kingdom has been the restoration of the historic Hellas; and the dissatisfaction of the people with existing territorial conditions has been a continual disturbing element in the Eastern situation. The Congress of Berlin (q.v.) in 1878 recommended a readjustment of the unfair and unscientific northern boundary; but Turkey refused to make the concessions demanded, and war between the two countries seemed inevitable. Finally, after protracted negotiations, the Powers in 1881 accepted the compromise offered by the Porte, giving Greece all Thessaly south of the northern watershed of the Salambria, including Larissa and Trikala, and in Epirus running the boundary along the Arta River, leaving Arta to Greece. Greece was not satisfied with this settlement, but accepted it under protest as the best arrangement possible at the time. The island of Crete was regarded by the Greeks as a natural Hellenic possession, and the desire for its union with the kingdom was intensified by sympathy for the Cretans under Turkish misrule. The bloody conflict between the Christians and Mohammedans that broke out in Crete in 1896 led Greece to make an attempt to annex the island. This action brought about the interference of the Powers, who decreed the autonomy of Crete and proceeded to compel Greece to withdraw her forces.

The Cretan disturbances gave the war party in Greece an opportunity to fan the embers of national passion into life, and to bring on a war with Turkey, in the hope of arousing Macedonia to revolt, and winning much of the desired territory on the north. Greece was wholly unprepared for such a conflict. Her army was ill organized, poorly officered, and insufficiently supplied with hospitals and commissariat, while the Turkish armies were in a comparatively efficient condition. Yet, in spite of all restraining counsel, and without any countenance from the Powers, without whose support such a contest was destined to be futile, the war party precipitated the struggle. Greek irregulars opened the fighting in Macedonia early in April, 1897. They were probably incited by persons high

in authority, although the regular Greek officers on the frontier and the Government disclaimed their acts. On the 17th of April the Porte declared war, charging Greece with being the aggressor. The campaign of thirty-one days that ensued was so inefficiently managed on the Greek side that it would have been ludicrous had it not been so pathetic. The Turks forced one position after another, the Greeks, under the incapable command of Prince Constantine, the heir to the throne, showing an unsteadiness in marked contrast to the discipline and determination of the Turks. The latter threw back the advanced line of the Greeks, who at first had a distinct strategic advantage, invaded Thessaly on April 21st, and occupied Larissa on the 25th, while the Greek army, now a panic-stricken mob, was in headlong flight. Heavy fighting occurred at Velestino April 25th, and at Fersala May 5th. The plain of Thessaly was occupied by the forces of Edhom Pasha, and in the third week of May the Turks held the line of the Orthrys Mountains, and threatened Central Greece. Their advance was stopped only when Russia peremptorily demanded an armistice. This was concluded on May 18th. Preliminaries of peace were signed September 18th, and on December 4th the definitive treaty was signed at Constantinople. Greece was required to pay an indemnity to Turkey amounting to $18,000,000, the payment to be supervised by an international commission of the mediating Powers, which also undertook to rectify the frontier. In 1898 the Powers compelled Turkey to withdraw her forces from Crete, and Prince George of Greece was installed as Governor of the now autonomous island. The war with Turkey was a great misfortune to Greece, which had otherwise enjoyed under King George a normally healthy development, and was slowly recovering its prosperity. It was with difficulty saved from serious loss of territory by the intervention of the Powers. The Greek people show all the political activity and restlessness of the ancient Athenian democracy; but, like their forefathers, they are inclined to divide into personal factions, lack steadiness, and need wise and firm leadership.

BIBLIOGRAPHY. Consult the histories of Grote, Curtius, Duncker, Thirlwall, Abbott, Holm, Busolt, and Beloch; also Freeman, *History of Federal Government in Greece* (London, 1893); Droysen, *Geschichte des Hellenismus* (Gotha, 1877-78); Kaerst, *Geschichte des hellenistischen Zeitalters*, vol. i. (Leipzig, 1901); Cox, *History of Greece* (London, 1874); id., *The Athenian Empire* (ib., 1877), and *The Greeks and Persians* (ib., 1876). The standard history of Greece from B.C. 146 to A.D. 1864 is that of George Finlay, a Scotchman, who took part in the War for Independence, and spent much of his life in Greece (new ed., 7 vols., Oxford, 1877). The division of the subject in Finlay's volumes is a convenient guide to the large periods of modern Greek history: I. Greece under the Romans, B.C. 146-A.D. 716; II. The Byzantine Empire, 716-1057; III. Byzantine and Greek Empires, 1057-1453; IV. Mediæval Greece and Empire of Trebizond, 1204-1461; V. Under Ottoman and Venetian domination, 1453-1821; VI. Greek revolution, 1821-27; VII. Establishment of the Greek Kingdom, 1827-64. Consult also: Tennent, *The History of Modern Greece, B.C. 146 to A.D. 1820* (London, 1830, 1845); Guerber, *The Story of the Greeks* (New York, 1898); Jebb, *Modern Greece*, two lectures with papers on the progress of Greece (London, 1880); Crousse, *La péninsule gréco-slave, son passé, son présent et son avenir* (Brussels, 1876); Lavisse and Rambaud, *Histoire générale* (12 vols., Paris, 1893-1900). There are also several histories in Greek, among them being those of Trikupis (London, 1860), Papparigopulos (London, 1886), and Lambros (Oxford, 1886). On special periods or phases of the subject the following deserve notice: Phillips, *The Greek War of Independence 1821-33* (London, 1897); Isambert, *L'indépendance grecque et l'Europe* (Paris, 1900); Bérard, *La Turquie et l'hellénisme contemporain* (Paris, 1893); id., *Les affaires de Crète* (Paris, 1900); Bickford-Smith, *Greece Under King George* (London, 1893); and *The Græco-Turkish War of 1897, from Official Sources by a German Staff Officer*, translation (London, 1898).

GREEK ART. In this article the subject will be considered as it manifests itself in sculpture and architecture. (For a general view of Greek artistic activity, see ARCHÆOLOGY; for Greek pottery, see POTTERY and VASES; and for Greek painting, see PAINTING.) The great artists and their works are the subjects of separate articles.

PREHISTORIC ART IN GREECE. The art of the Pre-Mycenæan and Mycenæan periods need not be treated here, as its influence is chiefly felt in other fields than those of architecture and sculpture, and its Hellenic character is still a subject of discussion. There is no connection traceable between the reliefs of Mycenæ and Crete and the rude beginnings of Hellenic sculpture in the seventh century B.C. In building the case is somewhat different, and though the gap is still a wide one, there can be little doubt that the Doric temple is derived from the Mycenæan house, at least in some of its characteristic features. The essential element of these early dwellings is the large rectangular room, to which entrance is gained through a vestibule or portico formed by prolongation of the side walls, and often partially closed in front by pilasters or columns. The plan is therefore that of a temple *in antis*. The materials used were stone for the foundations, crude brick for the walls, and wood for the roof columns and facings of the ends of the walls, where they were most exposed. The roofs were probably flat, and covered with earth, as is common in the East to-day. Between the decline of the Mycenæan period and the earliest extant Doric temple, the Heræum at Olympia, is a gap of some centuries, and in that time the adaptation or transformation of the human house into a dwelling for the god has been completed.

ARCHITECTURE: THE TEMPLE. In view of the evidence afforded by the Heræum and the later but very similar temple at Thermon, in Ætolia, it seems necessary to abandon theories that consider the Doric style a transformation into stone of an original wooden architecture, the development of a purely stone construction, or the stone reproduction of an original combination of wood and sun-dried brick. The lighter Ionic forms, however, seem to point to an origin in a purely wooden construction. As both orders are developed during the early period of Greek art, though both reached their culmination only in the fifth century, it will be convenient at this point to describe briefly the usual forms of the Greek

temple and the special characteristics of the great orders.

The simplest form of the temple is that already described, where the side walls of the main room (*cella* or *naos*) are prolonged to form a vestibule (*pronaos*). The walls end in pilasters (*antæ*), between which are columns, usually two. Sometimes a similar vestibule is constructed in the rear, forming a double *temple in antis*. If a row of columns is placed in front of the *cella* or *pronaos*, the temple is *prostyle*; if this row is repeated at the rear, *amphiprostyle*. A temple surrounded by a row of columns is *peripteral*; by a double row, *dipteral*; and the refinements of the later systematizing architects introduced further elaborations of nomenclature. The simpler forms were confined to very small buildings; all Greek temples of any size are peripteral. A further classification depends upon the number of columns across the front. Those with four columns are called *tetrastyle*; with six, *hexastyle*; with eight, *octostyle*; with ten, *decastyle*; and with twelve, *dodecastyle*. It should be observed that with rare exceptions the number of columns is always even, so that no column may block the approach to the door. The plan of the temple does not depend upon the order except in one point: In an Ionic temple two of the columns of the peripteros at each end are in the prolongation of the side walls, while in the Doric temple no such regularity is observed. Owing to its lighter forms, the Ionic order was a favorite in small buildings.

Passing to the details of the building, we have first the *stereobate* or foundation, preferably of native rock, but often formed by building walls under those parts of the temple which required the most support, and filling the spaces between with earth and clay. On or around these foundations was erected the *crepidoma*, a series of steps, usually three in the later temples. The upper step is the *stylobate*, and on this the columns of the peripteros rest. In some cases, as in the Parthenon, another step leads to a higher platform on which the cella is built. It is in the column and the entablature which the column sustains that the distinctive character of the orders is manifested. (See COLUMN; ENTABLATURE.) They are distinguished as Doric, Ionic, and Corinthian orders. (See these titles.) Of their history little can be said. The first two were coëxistent in the earliest period, and there was an increasing tendency to use the Ionic order, though not to the exclusion of the Doric. Though Greek architecture reached its highest development in the temple, it also manifested itself in other monuments. (See PROPYLÆA; STOA.) In all of these excepting the theatre (q.v.) the column was the principal architectural feature.

SCULPTURE: TECHNIQUE. Though wood and clay were sometimes used in sculpture, the common materials were stone and metal. In the early days of sculpture in stone the softer varieties of limestone, especially the so-called *poros*, were frequently employed because of the comparative ease of working. Later the harder marbles were employed, especially the fine white marble of Paros, and Mount Pentelicon, in Attica. The sculptor seems in general to have worked without mechanical copying of a model. For blocking out the statue a pointed instrument, either a punch or hammer, was employed, and the finer details were worked out with chisels of various shapes. In some of the earlier statues the deep folds of drapery seem to have been cut out by the saw; but later the borer was used, especially after the time of Callimachus (q.v.), who is credited with its invention by Pausanias, though it was almost certainly in use at an earlier date. Frequently the head and other parts of the body were carved separately, and of better material. In bronze the earliest works are in hammered metal, with engraved details; but at an early date casting was introduced, and thus the production of larger pieces became possible. Heretofore such statues had been produced by plating on wood, or riveting together metal plates. Solid casting was obviously too wasteful, and we early find examples of hollow casting, though the exact method of preparing the mold and core is uncertain. In later times the Greek artists used the *cire perdue* process, and it is possible this was in use before the end of the fifth century. Bronze was always the favorite material for honorary statues, and the artists in bronze seem to have enjoyed a higher esteem than their brethren who worked in stone.

USE OF COLOR. The plain white of the marble was too dazzling and monotonous for Greek taste; moreover, when poorer materials were used the stone often required color or stucco to conceal its imperfections. Our knowledge as to the details of the coloring of the temple is not very complete, though it has been much enlarged by the careful attention paid to the subject in recent excavations. In the Doric building the triglyphs seem to have been regularly blue; the metopes vary—at Olympia they were either blue or brown, with the reliefs in contrasting colors, while elsewhere red was also used. The smaller architectural members, such as mutules, regulæ, and guttæ, were also colored; but the walls, architrave, and columns, except possibly the neck, and sometimes the echinus, were plain. In the Ionic order color seems to have been used on the capital, but there is little knowledge of details.

In sculpture the question has been much discussed. It is clearly impossible to lay down general rules, for the practice varied with the time, place, material, and technique. What holds of the relief will not hold of the statue. Color was extensively used on all terra-cotta productions, and we have seen that it was also employed on sculptures forming part of a building. In general, the more valuable the material the more sparing the use of color. In the earlier works in coarse stone a very elaborate and brilliant system is used; later only the details are thus indicated. Except in architectural reliefs, there is very little evidence of the use of color on the nude parts of marble. In statues such surfaces seem to have been treated with wax and oil, thus toning down the surface of the marble and giving it a slight polish. The hair, lips, and eyes were regularly painted. In the garments a distinction seems possible. On the Acropolis statues (see Plate) the under garment, which only shows on the shoulder and about the feet, often receives a solid color. On the other garments only the borders or embroidery is indicated. It seems as if the artist desired to avoid large masses of color, unless the conditions were such that such a mass would form an effective contrast to the marble. In reliefs color is freely employed

for details, and many accessories are rendered entirely in this way, especially in the earlier art, while in the Hellenistic period we find very low relief employed to assist the painter. The Greek attitude toward the use of color was very different from that which now prevails; but the statues from the Acropolis and the beautifully tinted Alexander sarcophagus at Constantinople show that Greek taste in this regard was at least as good as our own.

HISTORY.

In sketching the history of Greek art, it is convenient to distinguish the following periods (see ARCHÆOLOGY):

I. The Archaic Period, extending to about B.C. 480, the era of the Persian wars.

II. The Attic Period, from about B.C. 480 to B.C. 323, during which the centre of Greek life is Athens.

III. The Hellenistic Period, which ends with the Roman Conquest (B.C. 146).

IV. The Roman Period, which may be extended to the foundation of Constantinople (A.D. 330), though constructive Greek art ceased long before.

These divisions are in their nature arbitrary, and no sharp line divides one from the other.

ARCHAIC PERIOD (till B.C. 480). This period may be conveniently divided into two parts: (a) The era of the formation of types and schools, and (b) the period of developed archaism, from about B.C. 550 to B.C. 480.

Formative Period.—The earliest Doric temples and other monuments of Greek art do not belong much before the year B.C. 700, unless Professor Dörpfeld is right in assigning the Heræum at Olympia to a date not far from B.C. 1000. The evidence here is very uncertain; but even if it is accepted, the building stands alone. The earliest sculptures in the round are probably not earlier than B.C. 650, though here any positive date is unattainable. All the evidence shows that the artists were not confined to any one part of Greece, but that a general activity developed throughout the Greek world, using much the same types, but treating them with certain differences. Much has already been accomplished in distinguishing the several local schools and identifying their products. Their characteristics, however, are so dependent on details that their discussion lies outside the scope of this article, and it will be more convenient to consider the works with reference to types rather than schools.

Statues may be male or female, draped or nude, standing or seated. An examination of the monuments shows that not all the possible variations were adopted by these early artists. The standing figure, if male, is usually nude; if female, draped; while the seated figures are generally clothed. The male standing figure bears a striking resemblance to the Egyptian statues in its pose, and the suggestion may have come from Egypt, with which the Greeks of the seventh century carried on an active trade; but the Greek artist, even at first, is no mere copyist, but endeavors to embody in the traditional form his own observations. These so-called 'Apollo' statues stand firmly on both feet, with the left foot advanced and the arms close to the sides. Little by little we may observe greater freedom, the arms are worked free from the body, though the hands are still pressed to the thighs, and a greater care in modeling, which seeks to bring out the muscles and bones, is manifest. Later in the period the type is modified, as in such a figure as the Calf-Bearer of the Acropolis, where the position of the hands has been completely altered, and the artist is fast freeing himself from some of the established conventionalities. The draped female statues are scarcely more, at first, than slabs of stone carved into a rude outline of the human form. The head and long locks of hair, the arms at the sides, and the two feet side by side just showing beneath the long robe, are the only details attempted. The body is clothed in a long garment, girded at the waist and hanging perfectly straight to the feet. Probably the ancient color indicated detail that has now disappeared. A good example is the native statue of Nicandra, at Delos. Later more care is used in the treatment of the drapery, and the style begins which is best represented in the sixth century by the Acropolis 'Maidens' (κόραι). The seated draped figures are best represented by the figures from Branchidæ in the British Museum. Draped in large mantles, whose stiff folds are barely indicated in low relief, their hands resting on their knees, they sit in their high-backed thrones, without life or dignity, though recalling in their pose some of the earlier Babylonian work.

While sculpture in the round is developing through modifications of stereotyped forms, a greater advance seems to have been made in reliefs, especially in those of an architectural character. These are typified by the metopes of the oldest temple of Selinus, in Sicily, which, in spite of their ugliness, at least show some freedom in design. Even more interesting, though no more beautiful, are the remains of pediments in 'poros' stone found on the Acropolis. They are among the earliest specimens of Attic art, and show it even then possessing characteristics of its own. Among these is the heavy build of the figures, which appears also in the 'Calf-Bearer,' and seems to cling to the Athenian School throughout the sixth century, if not longer. At the very end of this period a work survives which can at least be dated approximately—viz. the great Temple of Artemis at Ephesus, which was rebuilt during the reign of Crœsus (B.C. 560-46). The Ionic columns of this temple were adorned with sculptures in relief upon the lower drum, some of the fragments of which are now in the British Museum. They show an advanced technique, and give promise of high future development.

Developed Archaism.—With the period of developed archaism come the beginnings of real beauty and charm in the products of Greek sculpture. True, there are still serious technical defects, but the artists are fast emerging from the trammels of formalism, and already show much simplicity and devotion, combined with a true Greek grace and sense of proportion. The nude male type still clings to the old position, but the artist is now able to render the muscles better, to free the arms from the sides, and give some expression to the face. It is, however, in the draped female statue that the greatest advance is made, apparently by the Ionian artists of the Cyclades, especially of Chios. They developed the deep cutting of the folds of the drapery, and the change which this brought about is well indicated in the important series of statues discovered on the Acropolis of Athens. The gen-

REPRESENTATIVE WORKS

1. ARCHAIC FEMALE FIGURE from the Acropolis, Athens.
2. DISCUS THROWER by Myron, Rome.
3. BUST OF PERICLES, probably a copy of a statue by Cresilas.
4. GRAVE MONUMENT of Hegeso, Ceramicus, Athens.
5. SOPHOCLES, Lateran Museum, Rome.
6. THE VICTORY FROM SAMOTHRACE, The Louvre, Paris.

eral pose is the same in most of the series. The figure rests squarely on both feet, one of which is slightly advanced. One arm is bent at the elbow, and the extended hand probably held a patera or flower. The other arm hangs at the side, and the hand draws up the long skirt, thus giving an opportunity for the introduction of diagonal folds to relieve the perpendicular lines. The drapery, which varies somewhat in the different figures, is carefully worked out, and given much detail by the free employment of color. For the face in general not much can be said; the eyes and mouth still cause the artist trouble, and his attempts to secure expression too often produce only the exaggerations of the 'archaic smile.' At the end of the period, however, the skill of the artist has so far increased as to give us the beautiful heads of a boy and girl, which in dignity and sweetness of expression compare favorably with many products of a later age.

In these female figures a close analysis can detect differences which warrant the belief that some are the work of Chian or island Ionian artists, probably brought to Athens by the tyrants; while others, such as the statue by Antenor, seem to show, in their somewhat heavy build and plainness of conception, which holds aloof from the over-elaboration and excess of ornament, the work of the native Attic School, which had taken up the refinements and improvements of the newcomers, but without loss of its earlier characteristics. To the same native school must belong the figures of Athena and a fallen giant from the old Temple of Athena on the Acropolis. Interesting examples of the work of the Ionian schools have been found at Delphi, where the treasuries of Cnidos and Siphnos show the adaptation of the female type to a new use in Greek architecture. The columns between the antæ of these buildings were formed of a lofty base on which stood a draped figure bearing on her head a lofty 'polos,' which served as the capital, and furnished a suitable transition from the perpendicular lines of the column to the horizontal of the roof.

In general, the works of this period have not yet been classified in a thoroughly satisfactory manner. It seems clear that there were flourishing schools of sculpture in Asia Minor, Chios, Paros, and Naxos, and of bronze-workers at Ægina and Argos, while at Athens there is a school with well-defined local tradition. The study of the present is largely an endeavor to analyze minutely each new work, and in this way determine the characteristics of the different schools. This task is complicated by the cross-currents of influence which tended to obliterate local differences and produce a thoroughly national type of art. On some of the characteristics of this early art, see Lange, *Die Darstellung des Menschen in der älteren griechischen Kunst* (German trans. from the Danish, Strassburg, 1899).

Attic Period (B.C. 480-323). The Persian wars gave a tremendous impulse to the whole sphere of Hellenic life, and especially to the field of art. By the end of the archaic period the sculptor had obtained a mastery over his material, which enabled him to strive for new effects, and finally to produce the most perfect specimens of ancient art. This period may be divided into three parts: (a) The transitional period, extending to about the middle of the fifth century; (b) the age of Phidias and his immediate followers, ending with the century; (c) the age of Praxiteles and Scopas, which may be considered to end with the death of Alexander.

Transitional Period.—The works of the transition still show the traces of the archaic period, and the uncertainty as to some of the limits of their art. In this period belong probably the Æginetan sculptures (q.v.), and certainly those of the Temple of Zeus at Olympia (q.v.), and the metopes of the later temples at Selinus; but original works are few, and we are largely dependent upon more or less certainly identifiable copies in marble of the bronze statues of the masters. Of these few originals one of the best—indeed, the finest example of an ancient bronze statue—is the charioteer of Delphi, part of the group dedicated to the god by Polyzelus, brother of Hiero, Tyrant of Syracuse, between B.C. 478 and 472, in consequence of a victory in the Pythian games. Full of grace and charm, yet with a trace of archaic hardness still visible, this work of an unknown artist conveys some suggestion of the qualities that must have marked the work of the great masters.

The development of the artists of this period was much helped by the growing demand for statues of the victorious athletes, which were frequently dedicated at Olympia and the seats of the great games. The influence of the palæstra on Greek art has been often discussed, and in certain directions can scarcely be overestimated. Here the artist was enabled to see the perfectly developed human form to the best advantage, while the whole people became familiar with living beauty. The sculptor was at once furnished with the best of models, and intelligent and appreciative judges of his work. To this period belong Calamis, famous for his Attic grace; Pythagoras of Rhegium, whose athlete statues were especially celebrated; and above all Myron, whose Discobolus (q.v.) shows at once the skill and daring of the artist, who chose to fix the athlete at the height of his endeavor, and also the deficient grasp of the real limits of his material, which is not adapted for the permanent rendering of a transitory condition. Lastly may be mentioned the charming bronze, possibly a Greek original, now in the Palazzo dei Conservatori in Rome. It represents a boy drawing a thorn from his foot, and, as has been well said by Tarbell, "might be regarded as an epitome of the artistic spirit and capacity of the age."

Age of Phidias.—In passing to the age of Phidias, we pass at once into the full splendor of Greek art in its noblest form. It was the time when great works were planned and executed, for the most part in honor of the gods, for the great buildings are temples and the great statues are their adornment. Thus at Athens we have the whole series of buildings on the Acropolis, the Parthenon, the Propylæa, Erechtheum, and little Temple of Athene Nike, and in the lower city the so-called Theseum, still the most perfectly preserved of the ancient temples; at Rhamnus the Temple of Nemesis, with the statue of Agoracritus, which some attributed to Phidias; at Sunium the Temple of Poseidon; at Eleusis the great hall of the mysteries, the work of Ictinus, the architect of the Parthenon; at Argos the new Temple of Hera, with its chryselephantine statue of the goddess by Polyclitus; and the Temple of Apollo at Phigaleia, another work of

Ictinus. Among the artists besides the great names of Phidias of Athens and Polyclitus of Argos, are Agoracritus of Paros, the favorite pupil of Phidias; Alcamenes, the sculptor of the famous "Aphrodite in the Gardens"; Cresilas of Cydonia, in Crete, to whom is attributed with great probability the original of the portrait busts of Pericles in the Vatican and the British Museum; and Pæonios of Meude, whose flying Nike (Victory) at Olympia shows the solution of a problem which had long perplexed the Greek artists.

Through the best work of this period runs the spirit of self-restraint; the work is not for the display of technical skill, though every line shows the sureness of the artist's touch, but for the embodiment of a high ideal. In this nobility of conception lies the great superiority of this period over the ages that follow. Less full of grace and variety of expression, the works of the last half of the fifth century show a loftier moral tone and greater elevation of feeling. Nor is this wholly confined to the great works. The delicacy and simplicity of Greek art are seen even in the work of artisans, such as carved the great majority of the Attic tombstones, and who even, when working in the fourth century, show themselves but little affected by its spirit. The technique of these monuments is often faulty, but the good taste is unfailing. The deceased is represented as in daily life, alone or in the family circle; there is no direct suggestion of the grave, though in some of the later monuments of this class there seems to be a suggestion of melancholy in the attitude and expression; notably is this the case in a stone of the fourth century, in the style of Scopas, which seems to commemorate a young man mourned by his father and a little slave. The questions of interpretation to which this class of monuments has given rise are too numerous and intricate to be here discussed; nor is their settlement necessary to the appreciation of the merit of one of the most interesting and attractive products of Greek art.

Age of Praxiteles and Scopas.—With the fourth century we pass from the era of great State undertakings and enter the field of the individual. Not only do the personal characteristics of the artists seem to become more marked, but the works are more frequently the result of private munificence. The style of the sculpture shows the continuance of the two great schools of Athens and Argos, Praxiteles being the chief representative of the former and Scopas of the latter; but the points of divergence are not so strongly marked, and the differences in many cases may quite as well be assigned to the personality of the artist as to the tendency of the school. In the choice of subjects and their treatment, the same individuality is prominent. The earlier group of artists had idealized even their portraits, and in their statues of divinities, whether gods or heroes, had given what seemed like a final form to the loftiest aspirations of the popular religion. The religious beliefs of the fourth century were not so deeply rooted, nor was the general ethical standard so high as in the previous period; moreover, it was needful for the artist to seek a fresh point of view if he was to be other than a mere imitator, and this was found in a presentation of those traits which were more directly individual. This is especially marked in portraiture, which in the work of Demetrius of Alopeke, in Attica, became realistic in every detail, and the art of Silanion, famous for his statues of living men, seems to represent the same tendency as does Parrhasios in painting—the depiction of men as they lived. This tendency to individualize influenced also the statues of the gods, which are shown by a Scopas or Praxiteles less in their ideal perfection than in momentary and varying moods. They are more like men, and it is the desire of the artist to bring out the finer distinctions of personality which entered into the conception of the gods. This leads to an increased effort to render expression and personality in the features, and in this such an artist as Scopas far outstripped his predecessors. The mutilated heads from Tegea and the good copies of the Meleager show how, by concentrating his effort on certain parts of the face, the most intense energy and emotion could be brought home to the spectator without any painful distortion of the features. This endeavor to convey certain impressions to the spectator leads the artist to greater care in the finer points of rendering the texture of the skin, the play of the muscles, the folds and quality of the drapery, and the Hermes of Praxiteles is an example of the mastery of technique attained by a great artist. In all this tendency to realism, and sometimes toward sentimentalism, the high standards of the past and the Greek worship of moderation, which had not yet passed away, kept the greater artists within bounds, and we seldom find the extremes which became too common in a later age.

In architecture this period sees the development of the great stone theatres, such as that designed by the younger Polyclitus for the sanctuary of Asclepius at Epidaurus, and the theatre of Dionysus at Athens, which was probably rebuilt near the end of the period by the statesman Lycurgus. Other buildings on which the great sculptors labored were the temple of Asclepius at Epidaurus, with a cult statue made by Thrasymedes of Paros and acroteria and pediments designed by Timotheus; the Temple of Athene Alea at Tegea, built and supplied with pediment sculptures by Scopas; and, above all, the Mausoleum (q.v.), the funeral monument of Mausolus, Satrap of Caria, which was decorated with a multitude of reliefs and statues by the four artists, Praxiteles, Scopas, Timotheus, and Bryaxis. The rebuilding of the great temple of Ephesus also furnished Scopas an opportunity to display his skill on one of the new sculptured bases for the columns. One such base has been found, and is now in the British Museum. The scene has never been satisfactorily explained, though it is commonly referred to the story of Alcestis; but its style shows close affinity to that of Scopas, though it is scarcely probable that it is a work of his chisel. Among the other works of this period, attention should be called to the beautiful Demeter from Cnidos, now in the British Museum, which has been claimed for both Praxiteles and Scopas, and the famous Niobe group at Florence, a collection of Roman copies of a lost Greek original of this time. Pliny tells us that there was a difference of opinion as to whether a certain Niobe group was by Scopas or Praxiteles; but if these statues go back to that original, which is doubtful, it seems likely that the former must be chosen.

THE HELLENISTIC AGE (B.C. 323-146). In en-

tering upon this age we pass into a new phase of Greek art. The conquests of Alexander had opened the East to Greek rulers, Greek thought, Greek life, and had at the same time abolished the old supremacy of the cities of Greece. It is true that Athens still preserves a shadow of her former primacy; but the chief seats of art are now in Asia or Egypt, and the great schools which can be distinguished are those of Alexandria, Pergamus, and Rhodes. This change in the centres, however, is due to a still greater change in the artistic attitude and tradition. The great works of Greece had been completed, and the new Greek centres were now the scene of activity. These new works, however, were brought into contrast with the colossal products of the earlier Oriental civilizations, and, moreover, they were under the patronage of wealthy kings, anxious to vie with their predecessors. The earlier Greeks had not in general represented contemporary scenes, unless in an idealized form; but now the minds of men were filled with the wonderful conquests of Alexander and the fierce wars of his successors. Hence a tendency appears to commemorate the deeds of the present in colossal monuments, such as the great battle groups and the altar of Attalus and Eumenes at Pergamus, where in fact this tendency seems to have found its most striking expression. There is also another side to this substitution of the great monarchies for the free cities. The citizen, enriched by the new wealth and retiring from public affairs, seeks to beautify his house and gardens. More than ever art is at the service of the individual, and the taste of the patron determined the subject of the artist. The bustle and stir of the new age, with its nervous haste and constant change, seems to have produced, as so often, a sentimental reaction in favor of the good old times of innocence and the desire to retreat to nature from the great cities. The bucolic poetry is one expression of this sentiment, and in art, especially that associated with Alexandria, we find a further reflection of this tendency. Genre groups, especially those representing children or country life, are common, and a whole group of monuments, the so-called 'Hellenistic reliefs,' intended for insertion in walls in place of paintings, brings before us a number of these scenes, worked out with the most painstaking devotion to details, especially in the rendering of the accessories and background. (See Schreiber, *Brunnen Reliefs des Palazzo Grimani*, Leipzig, 1888, and *Hellenistische Reliefbilder*, Leipzig, 1889.) For while for the earlier artist the human figure had been of chief interest, and the background had been barely indicated or even entirely neglected, now in many cases the human figure is merely an incident. In response apparently to popular demand, art lends itself to themes hitherto but little treated; the trivial, fantastic, comic, and licentious all enter freely into the lesser products of this age. Not that all this art is to be condemned. Portraiture attained high excellence, and many of the lesser works, especially the beautiful terra-cotta figurines, show a delicacy and refinement of sentiment and a naturalness of conception which render them altogether pleasing. The technical skill of the artists is at its height, and their careful studies of anatomy bear fruit in astonishing accuracy in the rendering of details, which compels admiration even when their sensationalism calls for censure.

At the beginning of this period stands Lysippus of Sicyon (q.v.), the last of the great artists of the mother country whose personality is known to us, and who was regarded by his pupils and contemporaries as the culmination of artistic history. It is necessary to call attention here to his peculiar position as an artist who seems to have combined much of the Attic grace in conception with the careful attention to proportion, and to the technical side of bronze-casting, which belonged to a successor of Polyclitus as the leader of the Peloponnesian School. His influence was enormous, and much in Hellenistic art is little else than a modification or imitation of his peculiarities. The "Apoxyomenas" of the Vatican has long been the starting-point for the study of his art; but a most important addition to our sources has been made in the marble group of Daochas the Thessalian and his ancestors, recently discovered at Delphi, which can scarcely be anything else than a marble copy of a bronze original by Lysippus at Pharsalia. (See Homolle, *Bulletin de correspondance hellénique*, xxiii., Paris, 1899.) Other important works of this period are the "Nike of Samothrace," in the Louvre, which shows plainly the survival of the Attic School; the bronze figure of a seated boxer in Rome, where brutal realism is joined with a masterly appreciation of pose and technique; and a number of ideal portraits, in which the artist endeavors to give his conception of the character of the man, like the portraits of Homer, Anacreon, and many anonymous heads, which have often been most arbitrarily named. In Athens there are indications of an endeavor to return to the types of the fifth century, and toward the end of the period a pronounced archaistic imitation of the very early works with their stiff draperies and mincing gait appears. The art of Alexandria seems to have been largely decorative, and that school produced no great artists.

At Pergamus the great victories of Attalus I. (B.C. 241-197) were commemorated in a series of colossal statues, of which the "Dying Gaul" of the Capitoline Museum, and the noble group of the "Gaul and His Wife" in the Museo Ludovisi, are the best examples, though there are smaller copies of other figures, which seem to have been replicas of a series at Athens, in many European museums. Eumenes II. (B.C. 197-159), in his erection of the great altar, led the Pergamene art to one of its most characteristic works. The enormous extent of surface (about 400 feet long and 7½ high), and the tumultuous character which must necessarily belong to any representation of the "Battle of the Gods and Giants," gave the artists full scope for the display of variety in imagination and technical skill in the composition and execution. Though devoid of the calm simplicity desirable in monumental sculpture and characteristic of the best Greek work, the tremendous energy and the boldness of conception make the altar-frieze one of the notable monuments of the world. The tendencies of the Pergamene School seem to have been continued at Rhodes, where early in the Roman period, or possibly earlier, was produced the famous Laocoön group, a work in which the realistic representation of physical suffering reaches its highest point; a group that has been extravagantly praised and unstintedly condemned. The subject is unfitted for artistic use, but the artists

have treated it with a wonderful command of technique.

THE ROMAN PERIOD (B.C. 136-A.D. 330). This period may be briefly dismissed, as it is not in general an age of artistic originality, except in the works of Roman architecture and the marvelous accuracy of Roman portraiture. Greek art was known to the Romans through the wholesale plundering of the Eastern world for the decoration of Roman temples, palaces, and villas. It is the age of copies, when many of the works which fill our museums were executed—some of them by direct transference of the original through the aid of accurate measurements, as is shown by the *punctelli* still existing on many statues which were left by the sculptor to aid him in his work. Many more are free imitations and reproductions, such as mark the works of the school of Pasiteles, who sought his models in the early fifth century, and whose pupil Stephanus produced a nude youth which is obviously inspired by the Argive School associated with the name of Ageladas, and which became so popular that we find it combined with other figures, as in the group of Orestes and Electra at Naples. Another example is the Venus Genetrix of Arcesilaus, which is almost certainly a reproduction of the "Aphrodite in the Gardens" of Alcamenes. So, too, the Venus de Medici is a probably debased and sensualized version of the Cnidian Aphrodite of Praxiteles.

BIBLIOGRAPHY AND SOURCES. The sources of our knowledge of Greek art are twofold—the extant remains and the literary tradition. The monuments are, of course, the basis of all discussion of questions of style and technique; but their value is limited in the field of architecture by the ruined condition to which most ancient buildings have been reduced; while in sculpture the vast majority of the statues which fill the museums are copies of a later age, from which the style of the great masters must be extracted by careful and extensive comparisons, in which the influence of subjective criticism must necessarily be prominent. For the history of Greek art it is necessary to turn to the documentary evidence as preserved in inscriptions, which include the signatures of artists and the records of the erection of notable buildings, or in the writings of the ancients; and as these are in general late compilations, it follows that precision is sadly lacking on many points, and that our knowledge of the individual artists rests more often on skillful combinations than on positive evidence. One reason for this is the attitude of the Greeks themselves toward artists during the fifth and fourth centuries B.C. In general, while the work was highly valued, the artist was an object of little interest. This was due to the low esteem in which the artisan was held, as one whose confining labor hindered him from serving the State or cultivating his body or mind. Consequently, when in the third century B.C. interest in the personality of the great artists of the past arose, information was not always attainable.

The earliest treatises on art are naturally technical rather than historical. The Argive sculptor Polyclitus in his *Canon* discussed the correct proportions of the human form, and Ictinus, the architect of the Parthenon, wrote a technical description of his masterpiece. Not until the early part of the third century does a history of the earlier art appear. Xenocrates, an artist of the Sicyonian School, seems to have prepared a critical study of the great sculptors from the time of Phidias, in which he aimed to show that perfection had been reached only with Lysippus of Sicyon. A chronological arrangement was probably no part of his scheme, and it is not certain that he gave any account of the predecessors of Phidias, whom he chose to regard as the real founder of plastic art. At Pergamus the history of Greek art and the chronology and characteristics of the artists were worked out by such writers as Antigonus of Carystus and Polemon, often from very uncertain evidence, and with not a little freedom of combination. The writings of these men have perished, but their views have been preserved in the *Natural History* of Pliny the Elder and the *Description of Greece* by the traveler Pausanias, as well as by later lexicographers and scholiasts. The testimony of the classical writers to the history of art has been collected by J. Overbeck, *Antike Schriftquellen zur Geschichte der bildenden Künste bei den Griechen* (Leipzig, 1868), and by H. Stuart Jones, *Select Passages from Ancient Writers Illustrative of the History of Greek Sculpture* (London, 1895), containing also an English translation and commentary. There is an extensive literature dealing with the historical studies of the ancients and the sources of the extant writers, which is conveniently summarized in Jex-Blake and Sellars, *The Elder Pliny's Chapters on the History of Art* (London, 1896). This book contains the text of Pliny, with translation and commentary, an introduction discussing the sources, and a good bibliography. The signatures of the Greek artists were collected by Loewy, *Inschriften griechischer Bildhauer* (Leipzig, 1885); but this work needs supplementing, as many more are now known. For architecture, the only surviving literary source is the work of Vitruvius (q.v.), a practical architect of the time of Augustus, who drew from lost Greek writers, whom he sometimes misunderstood and mistranslated.

Although the importance of both monumental and literary evidence has always been recognized, it is only in recent years that systematic endeavors have been made to correlate these sources, and, by a comparison of extant works with the descriptions of the literature, to determine with approximate certainty the characteristics of the various schools, and, within certain limits, the artists of the originals from which our copies were made. The modern histories begin with the epoch-making work of Winckelmann (q.v.), in which the periods of rise and decline in Greek art were first clearly defined. This and other works published before the middle of the nineteenth century have now chiefly an historical importance, as the discoveries of recent years have vastly increased the material and revolutionized many of the earlier views. For the lives of the artists the fundamental work is still Brunn's *Geschichte der griechischen Künstler* (Brunswick; second edition, Stuttgart, 1889). The best brief work is Tarbell's *History of Greek Art* (New York, 1897). A standard work of the old school is Overbeck's *Geschichte der griechischen Plastik* (4th edition, Leipzig, 1893-94), which suffers chiefly from the separation of the monuments and literature. Probably the best history at present is Collignon's *Histoire*

de la sculpture grecque (Paris, 1892-97). Other good works are: Reber, *History of Ancient Art*, translated by J. T. Clark (New York, 1882); Mitchell, *History of Ancient Sculpture* (New York, 1883); von Sybel, *Weltgeschichte der Kunst* (Marburg, 1888); Gardner, *Handbook of Greek Sculpture* (London and New York, 1896-97); Springer, *Handbuch der Kunstgeschichte: das Alterthum*, 6th ed. by Michaelis (Leipzig, 1900). The great work of Perrot and Chipiez, *Histoire de l'art dans l'antiquité*, has reached in vol. vii. only the early archaic period and the development of the temple in Greek architecture. Of special value for architecture are Durm, *Handbuch der Architektur; Die Baukunst der Griechen* (Darmstadt, 1892); Penrose, *Principles of Athenian Architecture* (2d ed., London, 1888); and Choisy, *Histoire de l'architecture*, vol. i. (Paris, 1899), which is important from the strictly technical side. Of great value to the student are the catalogues of some of the principal collections, such as Friedrichs-Wolters, *Gipsabgüsse antiker Bildwerke des Berliner Museums* (Berlin, 1885); the *Catalogue of the Sculptures in the British Museum* (London, 1892); and Helbig's *Führer durch die öffentlichen Sammlungen klassischer Alterthümer in Rom* (Leipzig, 1899; English translation, London, 1895-96). The new school, which seeks to determine the characteristics of the great schools of antiquity and assign the surviving works to definite artists, is best studied in Furtwängler's *Masterpieces of Greek Sculpture*, translated by E. Sellars (London, 1895), in which the known works of Phidias, Polyclitus, Praxiteles, and others are used with great keenness and brilliancy as a basis for attributing to these artists many other statues in which the same characteristics appear. Under the title *Denkmäler der griechischen und römischen Skulptur*, the firm of F. Bruchmann in Munich is publishing large, permanent photographs of the most important remains of ancient sculpture; the more recent numbers are accompanied by a valuable descriptive text by competent German scholars.

GREEK CHURCH, The. In the widest sense of the term, all those Christians following the Greek or Greco-Slavonic rite. They agree in receiving the first seven general councils of the Catholic Church, but reject the supremacy of the Roman Pontiff, and all the later councils of the Western Church. The Greek Church calls itself "the Holy Orthodox Catholic and Apostolic Church." It includes three important branches—the Church within the Ottoman Empire, subject directly to the Patriarch of Constantinople; the Church in the Kingdom of Greece, ruled by the Holy Synod of Greece; and the Russo-Greek Church, in the Russian Empire, ruled by the Russian Holy Synod under the authority of the Czar. There are besides the churches of Rumania and Servia, which no longer recognize the authority of the Patriarch of Constantinople, and the Bulgarian Church, which has been independent since the Berlin Congress in 1878.

The tendency to make ecclesiastical dignity and authority follow political importance was noted early in the East. As a result of this the See of Jerusalem was at first only an ordinary bishopric under the Metropolitan of Cæsarea. Slight differences between Oriental and Occidental churches manifested themselves even during the first century. The Greek language was used in the religious services of the East, the Latin in the West. Certain unimportant liturgical differences arose, though the unity of faith was not affected thereby. In the West the Pope was the sole Patriarch; in the East there were at first three Patriarchs—those of Constantinople, Antioch, and Alexandria, and in 451 Jerusalem also became a patriarchate. The history proper of the Greek Church as a separate body dates from the commencement of the efforts on the part of the Church of Constantinople to establish for itself a distinct jurisdiction and an independent primacy in the eastern division of the Empire. The ecclesiastical preëminence of Constantinople followed upon the political distinction to which it rose as the seat of the Imperial Government. Originally Byzantium was but a simple episcopal see, subject to the Metropolitan of Heraclea. The rank of the see rose with the fortunes of the city, but there are many early instances in which questions arising within the district which afterwards became the Patriarchate of Constantinople, questions affecting the bishop himself, and even his relations to other patriarchs of the Oriental Church, were referred to the bishops of Rome. It was not long, however, before the political rivalries of East and West revealed a certain lack of harmony between Rome and Constantinople. The Council of Chalcedon (451) passed a decree which confirmed the precedence of Constantinople, and assigned to its Patriarch not only an extensive range of jurisdiction, but grounded these ecclesiastical privileges, in the case of the new as in that of the old Rome, upon the political precedence to which both had risen. The Roman legates protested against this canon. The consequence was a serious misunderstanding between the two churches, which was widened by certain doctrinal differences in some of the christological controversies. This culminated some thirty years later when the Emperor Zeno, in 482, issued the *Henoticon*, a decree meant to reconcile the Monophysites. This decree carefully avoided mention of the formula of the two natures in Christ, which had been adopted at the Council of Chalcedon. The *Henoticon* was accepted by the Patriarchs of Constantinople and Alexandria, who, as a consequence, were, with the Emperor, excommunicated by Pope Felix III. in 484. This is the first Eastern schism, and the Eastern and Western churches were actually separated for a period of about thirty-five years. The terms upon which the excommunication was withdrawn by Pope Hormisdas in 519 involved a complete acknowledgment of the exclusive supremacy of the Roman Pontiff. The Council in Trullo (see QUINISEXT), held in 592, caused a renewal of the misunderstanding by various decrees condemning Western ecclesiastical practices. The Patriarch, John the Faster, claimed the title of Ecumenical Patriarch, that is, Bishop of the Universal Church, toward the end of the sixth century. His claim was reprobated by Gregory the Great (see GREGORY I.), but the pretension was not entirely abandoned. Finally the foundation of the Western Empire, in close relations with the Pope, completed political separation, and certain patriarchs took advantage of it to foster Church disunion.

When Photius (q.v.), who allowed himself to be irregularly raised to the patriarchate while his predecessor was still alive, and to be un-

canonically consecrated after passing from layman through all the clerical ranks to that of patriarch in six days, proved too subservient to Bardas, the uncle of the Emperor, Michael the Drunken, and the virtual ruler, he was deposed by Pope Nicholas I. in 863. The deposed Patriarch appealed to the differences between the churches, especially the doctrine of the procession of the Holy Ghost, and the practice of celibacy among the Latin clergy, and, finding supporters, actual schism ensued. Under the next Emperor, Basil, this schism was healed, and though later Photius once more became Patriarch, he was finally banished in 886, by the Emperor Leo the Philosopher. It was almost two centuries before there was another open rupture, though there always remained some insecurity in the relations between Pope and Patriarch. In 1054 Michael Cerularius was finally excommunicated by Pope Leo IX. for fomenting heresy. Since then the schism has continued, although many attempts have been made to repair it. In 1098 at a synod held at Bari, by invitation of Pope Urban II., the famous Anselm, Archbishop of Canterbury, stated the doctrine of the procession of the Holy Ghost in the hope of winning back the Greeks, but without effect. The presence of the Crusaders in the East might have been expected to renew sympathy between the churches. But the rapacity and cruelty manifested in the establishment of the Latin Empire at Constantinople widened the breach between East and West. The Greek Emperors, partly perhaps through political motives, in order to get help from the West against the advancing Moslems, endeavored to bring about Church union. Michael Paleologus (see PALEOLOGUS) sent ambassadors to the Council of Lyons in 1274, who formally abjured the schism. The bishops refused to ratify the union thus brought about. John Paleologus a century and a half later brought about a reopening of negotiations for union. The Patriarch of Constantinople and a number of Church dignitaries from the East attended the Council of Ferrara and Florence, held in 1438-39. All the doctrinal points of difference were discussed, and the Greek Churchmen present, with the single exception of Mark, Bishop of Ephesus, formally signed the decrees of the council. The action of the Greek bishops was repudiated by the majority of the Greek clergy. The downfall of the Greek Empire in 1453 obliterated all trace of the reconciliation. A number of attempts have been made by Protestant communions to establish an understanding with the Greek Church. Melanchthon addressed a letter to the Patriarch Joseph of Constantinople, through a deacon of the Church, who visited Germany in 1558. Two well-known Tübingen divines, Andreæ and Crusius, visited Constantinople during the patriarchate of Jeremias, 1576 to 1581. Both missions were unsuccessful. In the following century the celebrated Cyril Lucaris (see LUCARIS), who was educated in the West, and carried home with him a strong but well-concealed bias toward Protestantism, was elevated to the patriarchate, and issued a decidedly Calvinistic confession of faith (1629). This caused Lucaris's deposition, and called forth a doctrinal declaration signed by the patriarchs of Constantinople, Alexandria, and Antioch, and many metropolitans and bishops, which by the clearness and decision of its definitions draws the line so markedly between the Greeks and Reformers as to shut out all possibility of accommodation in matters of doctrine. This exposition, the author of which was Peter Mogilas, Metropolitan of Kiev, and which was published in 1640, was adopted in a synod held in Jerusalem (1672) as the creed of the Greek Church. In 1722 it was published by order of Peter the Great as the authorized formulary of the Russian Church. It differs very little from the formularies of the Roman Catholic Church.

The doctrinal differences between the Greek and Roman churches consist chiefly in the rejection by the Greeks of the word *Filioque* (q.v.) in the creed, in which the Greeks disagree with all Trinitarians; in their rejection of the supremacy of the Pope, and of the word purgatory, though they believe in a state of purgation after death, and in the efficacy of prayers for the dead. They teach seven sacraments, though the ritual of their administration differs somewhat from the Roman. Baptism is by triple immersion. Confirmation is given with baptism even to infants, and by priests, not bishops exclusively. The Greek Church teaches transubstantiation, just as the Latin, and the adoration of the Host, though this has been denied by Protestants. It uses leavened instead of unleavened bread for the sacrament, and gives communion in both kinds even to children. Extreme unction has certain special rites, and may be given several times during the same illness. There are ritual peculiarities also in the administration of Holy Orders. (See ORDERS, HOLY.) Marriage is allowed to priests and deacons before ordination, and is in fact rather encouraged. Bishops are required to be celibate, and are consequently selected from the monastic orders. Second marriage, however, or marriage with a widow, is not permitted. Prayers to the Blessed Virgin and the saints, whose pictures are exposed for veneration, are common. Graven images are not permitted, except of the Cross, though crucifixes are not used. The sign of the cross is often employed. Instrumental music is not allowed in the churches, but vocal music, by male voices only, is developed to a wonderfully impressive degree. In general the splendor of ceremonial is not inferior to that of the Latin Church. The Holy Mysteries are celebrated in a sanctuary entirely separated by a partition from the rest of the church. During Lent, except on Saturdays and Sundays, there is only the mass of the presanctified, as in the Roman Church on Good Friday. (See HOLY WEEK.) The people pray standing, facing the east, and kneel only at Pentecost. The Greeks believe firmly in the merit of good works and of self-denial. Monastic institutions have existed in the Greek Church from the earliest times, and there are numerous convents of both sexes which follow almost exclusively the rule of Saint Basil. This enjoins poverty, chastity, and obedience. The monks are not priests as a rule, but they are bound to recite the Divine Office. They are not permitted by rule to eat meat.

Of the three important divisions of the Greek Church, that in the Turkish dominions is under the jurisdiction of the Patriarch of Constantinople, who is the acknowledged superior of the three other patriarchs of Alexandria, Antioch, and Jerusalem. The patriarch is named by the patriarchal community, consisting of the digni-

taries, lay and cleric, of the patriarchal household, of the notables and the merchants of the city, and of the heads of corporations. Their choice is limited, however, to one of three candidates, who must be metropolitans, selected by the Holy Synod of bishops. The elect one does not become patriarch until invested by the Government, which also has the power to depose. This has led to abuses and simoniacal practices. During the nineteenth century many of the patriarchs were deposed for extortion at the request of the Synod.

The Greek Church in Russia became practically independent by the appointment of a Patriarch of Moscow in 1588. The dignity was subordinate to the Patriarch of Constantinople until the reign of Czar Alexis, father of Peter the Great, when the Patriarch of Moscow, Nikon, refused to acknowledge the jurisdiction of Constantinople. About the year 1700, on the death of the Muscovite Patriarch, Peter the Great would not permit the appointment of another, but allowed the authority to be exercised to a certain extent by a bishop under the name of exarch. After the lapse of twenty years, during which time the people became accustomed to the idea of having no patriarch, a holy synod or governing committee was appointed, over which the Czar has ever since presided. The leading principle, in fact, of the new constitution of the Russian Church is the absolute supremacy of the Czar. The Holy Synod is now regarded as one of the departments of the Government, the Minister of Public Worship being ex-officio a member. To this body, through a bishop, residing in San Francisco, and bearing the title of Bishop of Alaska and the Aleutian Islands, the churches of this communion in the United States, which are partly supported by the Russian Government, are responsible. There are 58 of them, with some 40 priests, and 45,000 adherents. Their periodical organ is the *Amerikansky Russky Viestnik* (New York), to which is published in English a monthly *Russian Orthodox American Supplement*.

The Greek Church of the Kingdom of Greece originated with the revolution of 1821-29, which made the country independent of Turkey. The new Church was organized by a formal decree in 1833. The Patriarch of Constantinople claimed jurisdiction until 1868, when he acknowledged the entire independence of the Greek hierarchy. The government of the Church of Greece is modeled on that of the Russian Church. Ecclesiastical authority is vested in a Holy Synod consisting of five members, usually archbishops, or bishops, though exceptionally a monk or a priest may be among the number. This body is supposed to be independent in spiritual affairs, but as its members are appointed by the Crown and hold office only for a year, it has become in practice a State instrument. Moreover, two officials of the Crown have the right to assist at all deliberations, though without votes. The Holy Synod elects bishops, but the Crown has the right of confirmation and investiture. The Church of Greece is represented in the United States by five priests, five churches, and 20,000 adherents.

The Eastern Church in its various branches is estimated to number about 98,000,000 adherents, of which over 90,000,000 belong to the Russian Church. For the bodies which follow in many particulars the Greek usages and liturgy, but are in communion with the Pope, see UNIATES; EASTERN RITE, CHURCHES OF.

Consult the general Church histories, Schaff, Darras, Neander, etc., or Hefele, *Concilien-Geschichte* (Freiburg, 1851-73); and Neale, *History of the Holy Eastern Church* (5 vols., London, 1850-73); Dean Stanley, *History of the Eastern Church* (London, 1861); Silbernagel, *Verfassung und gegenwärtiger Bestand sämmtlicher Kirchen des Orients* (Landshut, 1865); Tozer, *The Church and the Eastern Empire* (London, 1888); Hergenröther, *Monumenta Graeca ad Photium Pertinentia* (Regensburg, 1869); id., *Photius, Patriarch von Constantinopel, sein Leben und seine Schriften* (3 vols., Regensburg, 1867-69); Howard, *The Schism Between the Oriental and Western Churches* (London, 1892); Röhan, *L'église orthodoxe gréco-russe* (Brussels, 1897); Gagarin, *The Russian Clergy* (London, 1872); Horton, *Student's History of the Greek Church* (New York, 1902); Pierling, *La Russie et le Saint Siège, études diplomatiques* (Paris, 1896); also *Papes et Tsars* (Paris, 1890). Pierling is the author of a series of works on the relations between the Holy See and the Czar during the sixteenth and seventeenth centuries.

GREEK CROSS. See CROSS.

GREEK EMPIRE. See BYZANTINE EMPIRE.

GREEK FESTIVALS. Celebrations for the most part in honor of some god, and in their regular recurrence corresponding with the weekly rest-day of Jews and Christians. Offerings to the gods on the part of the State or individuals were of almost daily occurrence, but of course caused no general cessation of labor. On the other hand at frequent intervals occurred great celebrations, during which there seems to have been a general suspension of business, both public and private. These festivals were in general local, and their number naturally varied greatly in different places, and at different times. The Athenians were famous for the number and splendor of their festivals, while, later, Tarentum was said to have more holidays than working days in her calendar. The tendency seems to have been to increase the number and duration of these occasions, though it may well be doubted whether there was not a decrease in devotion. More and more the games, processions, and feasting at public expense seem to have become the chief attraction. Sacrifices on the part of the State were of course a part of all such solemnities, and frequently the image of the god was carried in solemn procession, but in the details there was a wide difference. Some festivals were attended with athletic contests, or recitations by the rhapsodists; some were the scene of musical or dramatic contests; while others were accompanied by rites which are obviously survivals of early popular superstitions, and for which analogies may be found in the folklore of other peoples. Thus at the Festival of Apollo, held in Attica during the month Pyanepsion, which theoretically began about the end of October, cooked beans as a symbol of the fruits of the autumn were offered to the god, and an olive branch, the so-called Eiresione, hung with figs, cakes, and small jars of oil, wine, and honey, was carried through the streets, and suspended from the temple by a boy whose parents were still living. Similar branches were borne by the attending worshipers, and afterwards hung at the doors

of their houses. A complete list of the Greek festivals does not lie within the scope of this article, and may the more easily be omitted as many of them are mere names, about the ceremonies connected with which we have no information. The great national festivals were the Olympian, Pythian, Isthmian, and Nemean, for which see the articles OLYMPIC GAMES; PYTHIAN GAMES; ISTHMUS; NEMEA. The great Athenian festival in honor of Athena, which almost attained national rank, is treated under PANATHENÆA, and the Eleusinia in honor of Demeter are discussed under MYSTERIES. In the remainder of this article a few of the more prominent or interesting of the local festivals will be briefly described, particularly those of Athens, for about them we are best informed.

The APATURIA occupied three days of Pyanepsion (October), and were not properly a State festival, as they were celebrated by the phratries, in one of which every Athenian citizen was enrolled. On the first day the phratry dined together, on the second sacrifices were offered to Zeus phratries and Athena phratries, and on the third occurred the most important act of the festival, the reception into the phratry of the children born to its members in lawful wedlock during the previous year. Each father made oath as to the legitimacy of the child and furnished an animal for sacrifice. Boys also seem to have shown their progress in their studies by recitations from the poets. At some time during the festival sacrifices were made to Apollo Patroös, Hephæstus, and probably Dionysus of the black goatskin (μελάναιγις). The celebration of the Apaturia is declared by Herodotus to have been characteristic of all true Ionians, but of the details of the celebration outside of Athens we are not informed. In the month Munychion (April) were celebrated the DELPHINIA, in honor of Apollo. This festival was connected with the legend of Theseus's voyage to Crete, and as it occurred at the opening of navigation, and was marked by a procession of maidens bearing suppliants' branches of the Temple of Apollo to entreat his mercy, it seems to have been in the nature of a propitiation of the god, that he might grant favorable weather to seamen. A festival of the same name, accompanied by athletic contests, was celebrated at Ægina, and as Delphinios is the name of a month in many Greek calendars, it is probable it was also celebrated elsewhere. Noteworthy for a curious ceremony were the DIPOLIA or DIPOLIEIA, celebrated in honor of Zeûs in Scirophorion (June). On an altar on the Acropolis were placed barley and wheat, and an ox prepared for sacrifice was allowed to approach and eat. As soon as he tasted the sacred food he was struck down with an axe by a priest, who at once dropped his axe and fled. The pursuit was only a form, but subsequently all the participants were placed on trial, and finally the axe was condemned and cast over the borders of the country. The skin of the ox is said to have been stuffed and fastened to a plow. The whole ceremony seems to have originated at a time when the plow-ox was held sacred, and even his sacrifice to the gods needed atonement. In the Attic festivals a prominent place was occupied by the DIONYSIA, in honor of Dionysus. Four such festivals can be distinguished, though only two of them bear this name. In Poseideon (December) the Lesser or Country Dionysia were celebrated throughout the villages of Attica with every kind of merry-making and mummery. A village procession led a goat for sacrifice to the altar of the god, and with the growth of the drama, plays, which had already been produced in the city, were performed in the country theatres. In the next month (Gamelion) a similar festival, the LENÆA, was celebrated in the city by the King Archon, at which plays were performed and sacrifices offered, so that they extended over several days. The next month, Anthesterion (February), was the time for the celebration of the ANTHESTERIA, which lasted three days. On the first day, the casks of new wine being opened, each family sacrificed, and rejoiced at the coming of the god of wine and spring. The second was the great day, on which the wife of the King Archon visited the ancient Temple of Dionysus in Limnæ, and after various ceremonies returned to the Boukoleion, which she entered alone to be wedded to the god. The evening was one of wild revelry throughout the city, and seems to have ended in a great drinking bout at which he who first emptied his goblet received a prize. The third day was devoted to the gods of the lower world, and special offerings of the fruits of the earth were cooked for Hermes, the leader of the souls to the lower world. There are indications that during this festival the ghosts of the dead were believed to return to the world, and it is certain that the temples of the heavenly gods were closed during the whole festival. It seems therefore that the joyous revelry had been added to a celebration of quite a different character. Finally in Elaphebolion (March) came the GREATER or CITY DIONYSIA, with the exception of the Panathenæa, the most splendid of the Athenian festivals. On the eve of the first day a solemn procession escorted the statue of the god from his temple to the theatre. The first day was given up to the choral and lyric contests, and closed with a great procession of masqueraders. The three following days were filled with the performances of the new tragedies and comedies, in the presence of an immense throng of citizens and strangers. Before this throng the sons of those who had fallen in battle, on reaching their majority, were presented by the State with shield and spear. The importance of this festival for the development of Greek literature in its most finished and characteristic product, the Attic drama, can scarcely be overestimated. The 7th of Thargelion (May) was the birthday of Apollo, and in preparation for its celebration a solemn purification was necessary on the 6th. The whole festival was the THARGELLA, and, like other Greek festivals, it was a union of the solemn and the glad. The first day saw solemn sacrifices to Demeter and the Mœræ or Fates, and there are indications that even in historical times two human victims were sacrificed to avert the wrath of the god, who sent the summer pestilence. In the fifth century B.C. these victims seem to have been simply driven from the country. The second day saw the glad offering of the first fruits to Apollo, Helios the sun, and the Horæ, or Seasons, through whose care they had ripened. Last may be mentioned the solemn rites of Demeter and Persephone, celebrated by the women, at the THESMOPHORIA, from the 9th to the 13th of Pyanepsion (October). On the first day the women retired to a village near Athens,

where on the second day secret rites, seemingly full of jests and mockery, were performed. On the third day they returned to the Thesmophorion, a temple of the goddesses in Athens, where on the fourth day they fasted and offered propitiatory or expiatory sacrifices. The fifth day was given up to dances and games, which were apparently of very doubtful propriety, and the celebration ended with banquets given by the wealthier women, and a solemn sacrifice.

Among the Spartans two festivals of Apollo occupy the chief place. First the HYACINTHIA, celebrated at Amyclæ, the ancient capital of Laconia, and connected with the accidental death of Hyacinthus (q.v.), the favorite of the god. It drew together the whole population of Sparta, and its observance was so strong a religious obligation on the men of Amyclæ that they even sought leave from their generals in order to return for it. It came in the spring, and united mourning for the death of the boy with joy at his return. The first day was given up to sorrow, and an offering at the grave beneath the altar of Apollo; on the second day were choruses by boys, processions, and dances, while the evening was spent in feasting. The doings of the third day are not reported, but very possibly at this time the venerable image of Apollo was presented with the new robe which the women of Sparta embroidered yearly. Even more important was the great festival of the CARNEIA, held during nine days of summer, and so highly regarded by the Spartans that, when it approached, no military operations were undertaken. It was originally a herdsmen's festival, but at Sparta had assumed a military character. The men bivouacked in booths, in nine divisions, and all the exercises were governed by the commands of the herald. We hear also of musical contests, and a singular foot-race in which one man was pursued by a number of others. If he was caught it was a sign of good luck, while his escape foreboded evil. Parallel usages among other peoples seem to show that the runner is a personification of the fruits of autumn, so that his capture assured prosperity. Both these festivals were common to the whole Dorian race, but the details of their celebration at other places are unknown.

At Delphi, in the THEOPHANIA, the return of Apollo in the spring after his winter sojourn among the Hyperboreans was celebrated, while in the THEOXENIA Apollo and the other gods were entertained at a sumptuous feast to which distinguished men, such as the poet Pindar, were sometimes invited as a mark of respect. Other festivals of this kind were celebrated elsewhere in honor of other gods. Throughout Bœotia, and also at Delphi, it was common to honor Apollo with processions in which laurel branches were carried. At Thebes these DAPHNEPHORIA were celebrated only every ninth year, when the god was represented by his youthful priest, who was preceded in the procession by a relative carrying a long olive rod, wound with laurel and flowers, and with iron balls at each end and the middle, to which numerous ribbons were attached. The priest was followed by a chorus of maidens with suppliants' branches, who sang the praises of the god. Among the splendid festivals of Greece were the DELIA, celebrated every fifth year at the beginning of spring, by the Ionians at Delos. In this form the celebration was instituted by the Athenians in B.C. 426-25, after they had carefully purified the island by the removal of all graves. In the years of its occurrence it replaced the old annual festival of the Apollonia. To it the Athenians sent a State delegation on the ship which was said to have carried Theseus to Crete, and during its absence no death sentence could be executed, a law which prolonged the life of Socrates for nearly a month. It was accompanied by athletic games, horse-races, and competitions between choruses, and seems to have been the scene of the most famous musical contests. After the great victory of Platæa, Pausanias and the Greeks instituted the ELEUTHERIA in gratitude to Zeus, the Giver of Freedom (Eleutherios), and these were celebrated with annual sacrifices and athletic contests in every fifth year at least as late as the second century of our era. In connection with some festivals we hear of CALLISTEIA, contests of beauty, which were between women on Lesbos and Tenedos, in connection with the worship of Hera, and at Basilis in Arcadia with the worship of Demeter, while in Elis the contestants were men, and a similar rivalry between the old men of the tribes seems to have formed part of the Panathenæa.

The festivals of the gods are noted in Preller, *Griechische Mythologie*, 4th ed. by C. Robert (Berlin, 1887-94); consult especially Index IV. They are also briefly described in Schömann-Lipsius, *Griechische Alterthümer*, ii. (Berlin, 1902); and Stengel, "Griechische Kultus Alterthümer," 2d ed. in Müller, *Handbuch der klassischen Alterthumswissenschaft* (Munich, 1898). For Athens, consult A. Mommsen, *Die Feste der Stadt Athen im Alterthum* (Leipzig, 1898).

GREEK FIRE. The common name for a great variety of combustible and explosive compounds employed by the Greeks of Constantinople throughout the Middle Ages. Bury thinks the simplest weapon was the hand-tube, "full of combustibles, which was flung by the hand like a 'squib,' and exploded on board the enemy's vessel." Besides many other weapons the Greeks used one very similar to the modern gun, in which some sort of gunpowder was used to expel liquid combustibles. Constantine Porphyrogenitus (q.v.) states that this was invented by Callinicus of Heliopolis in the seventh century. The recipe for the gunpowder is preserved in a treatise of the ninth century entitled *Liber Ignium ad Comburendos Hostes*. In the *De Mirabilibus Mundi*, ascribed to Albertus Magnus, the manufacture of Greek fire is thus described: "Quick sulphur, dregs of wine, Persian gum, baked salt, pitch, petroleum, and oil are boiled together. Anything placed in it and set on fire, either wood or iron, can be put out only by vinegar or sand." These combustibles were most effective in mediæval warfare, and gave the Greeks a superiority for centuries. Apparently, however, they never used leaden or iron balls. Consult: Bury, *The Later Roman Empire*, vol. ii. (New York, 1889); Oman, *The Art of War* (London, 1898); Bury's edition of Gibbon's *Decline and Fall*, vol. vi., appendix v. (London, 1898).

GREEK KALENDS (Lat. *Kalendæ Græcæ*). A phrase used by the ancient Romans in allusion to the fact that there was no date in the Greek calendar corresponding to the Roman Kalends, and jokingly applied to the indefinite postpone-

ment of a promise that was intended never to be fulfilled. The expression is referred by Suetonius to the Emperor Augustus, who is said to have first employed it.

GREEK LANGUAGE. The Greek belongs to the Indo-European family of languages, and is closely related to the Italic dialects—Latin, Oscan, Umbrian, etc. Greek, however, has preserved a far greater number of forms from the so-called parent language than any of the Italic dialects. This variety of forms, and a great power to form new words, combined to render Greek the most flexible and beautiful language of the whole Indo-European family.

Alphabet and Pronunciation. The age of writing in Greece is unknown, although recent discoveries have made it appear probable that some system of writing existed long before B.C. 1000. The earliest Greek inscriptions cannot be dated earlier than the seventh century B.C. The alphabet in which these inscriptions are written, and which is the parent of all modern European alphabets, was derived from that of the Phœnicians. The Phœnician alphabet consisted of 22 signs, which the Greeks adapted to their own phonetic system, adding to them four new signs, Υ, Φ, Χ, Ψ, although the value of the last two was not the same in all alphabets, the Eastern Greeks using the former with the value of (hard) *ch*, the latter with the value *ps*, while the Western Greeks gave to Χ the value of English *x*, and to Ψ the value of *ch*. One of the Phœnician signs for *s* was very early dropped, and in the Eastern group of alphabets ϝ and ϙ fell into disuse, in consequence of the gradual loss in the spoken language of the sounds (*w* and hard *k* respectively) which these symbols represented. Further than this, the Ionians, as early as B.C. 550, began to use the symbol Η to represent the sound of long *e*, and invented a new letter Ω to represent the sound of long *o*. The Attic alphabet at first occupied a middle ground between the Eastern and Western groups. It did not use ϝ and rarely ϙ. It had Υ, Φ, and Χ with the values given them in the Eastern alphabets, but not Ξ or Ψ, for which it used ΧΣ and ΦΣ. It retained Η for *h*, and used Ε for both long and short *e*, as well as for the spurious diphthong ΕΙ (vide infra), and Ο for long and short *o*, and the spurious diphthong ΟΥ. This old Attic alphabet was used in official documents at Athens until the archonship of Euclides (B.C. 403), when the Ionic alphabet, which had long been in use in private life, was adopted for the public records, and rapidly drove out the old local alphabets. The 24 signs of the Greek alphabet, as finally developed, with the corresponding English letters, are as follows:

Greek	English	Greek	English
Α α	a	Ν ν	n
Β β	b	Ξ ξ	x
Γ γ	g	Ο ο	ŏ
Δ δ	d	Π π	p
Ε ε	ĕ	Ρ ρ	r
Ζ ζ	z	Σ σ ς	s
Η η	ē	Τ τ	t
Θ θ	th	Υ υ	u, y
Ι ι	i	Φ φ	ph
Κ κ	k	Χ χ	ch
Λ λ	l	Ψ ψ	ps
Μ μ	m	Ω ω	ō

The 'rough breathing' (') is placed over an initial vowel and over ρ to signify that the word begins with an aspirate (*h*); so, ἅρμα, pronounced *harma*. The 'smooth breathing' (') means that the initial vowel is without the *h* sound.

Most of the consonants were pronounced in the fifth century B.C. like the corresponding English letters, except that γ was always hard (as in *go*) and before κ, γ, χ and ξ had the sound of *n* (as in *sing*); ζ was pronounced like *dz* in *adze;* θ was always pronounced like *th* in *thin;* and χ was hard, as in German *ach*. The vowels were pronounced: α like *a* in *father*, ε like *e* in *met*, η like *e* in *prey*, ι like *i* in *machine*, ο like *o* in *obey*, υ like French *u*, German *ü*, ω like *o*, in *tone*. The sounds of the diphthongs αι, ει, οι, αυ, and υι are those of the diphthongs in *aisle, eight, oil, our, we*, respectively; ου early became a simple sound as in *group;* ευ and ηυ were pronounced *ĕh-oo* and *ĕh-oo*. In ᾳ, ῃ, and ῳ the ι subscript was at first distinctly pronounced, but later its sound was lost, and these diphthongs came to have the sound of simple α, η, and ω.

Accent. The Greek accent, unlike that of the English, was an accent of pitch, not of stress. Three sorts are distinguished — the acute (marked ´), or high tone, extending to the end of the vowel or diphthong upon which it falls; the circumflex (marked ~), or high tone followed by a lowering of pitch, used only on long vowels and diphthongs; and the grave (marked `), indicating a lowering of pitch. The grave accent is used only as a substitute for the acute on the last syllable of a word when it precedes another word. The circumflex may stand upon either of the last two syllables, but on the penult only when the last syllable is short. The acute stands on any of the last three syllables, but on the antepenult only when the last syllable is short. With these limitations, the accent of most words is recessive, but never stands further from the end than the antepenult. A number of short words, called proclitics and enclitics, have no accent, but lean upon the words which they immediately precede or follow.

Dialects. Long before the dawn of history Greek comprised a number of dialects, which maintained their individual peculiarities until comparatively late times, although these differences were never so great as to prevent easy communication between the inhabitants of different districts. The study of the Greek dialects has been greatly advanced in recent years by the discovery and publication of inscriptions. In general, the dialects fall into the two groups of Ionic and non-Ionic, distinguished by a tendency on the part of the Ionic dialects to change original *ā* to *ē*. Further than this we can distinguish, inside the non-Ionic group, two families of dialects, the Æolic and the Doric, although recent investigation has shown that this twofold division cannot be carried out as strictly as was formerly supposed. The principal characteristics of the Ionic, Doric, and Æolic dialects are as follows:

Ionic.—The Ionic dialect is characterized by (1) a wholesale change of original *ā* to *ē*; (2) the early loss of ϝ; (3) the use of ἄν = κα, κε. Two forms must be distinguished:

(1) The Ionic of the Asiatic coast and many of the Ægean islands, frequently named simply Ionic. This displays a marked aversion to con-

traction and admits successive vowel sounds. It includes:

(*a*) Old Ionic, the language of the Homeric poems, and of epic poetry in general, a dialect partly artificial and probably never spoken at any one time.

(*b*) New Ionic, the spoken language of the Ionian cities, with many local variations, but showing a preference for κ instead of π in pronominal roots (κοῖος, κόσος = Att. ποῖος, πόσος), frequent preference for ω instead of αε or ου (θῶμα, ὦν = Att. θαῦμα, οὖν), and dislike of aspirates (ἐπορᾶν, δέκομαι = Att. ἐφορᾶν, δέχομαι). This is the language of the early logographers, of Herodotus and Hippocrates.

(2) *Attic.*—Closely related to Ionic, but differing from it in the retention of α in certain positions (πράττω, μανία = Ion. πρήσσω, μανίη), and in a marked tendency to contraction of vowels. This is the principal literary dialect, used in the works of Thucydides, Xenophon, Plato, the dramatists and the orators. It is commonly taken by grammarians as the norm, and the other dialects are regarded as variants, although there is no historical justification for such a proceeding.

Doric.—Doric was spoken on the Isthmus, in the greater part of the Peloponnesus, Corcyra, Magna Græcia, Sicily, Cyrene, Crete, Byzantium, Rhodes, the southwestern corner of Asia Minor, Melos, and some of the other islands of the Ægean. It is, in the main, the language of Pindar and Theocritus. It is characterized by (1) retention of α where the Attic prefers η (μάτηρ = Att. μήτηρ); (2) formation of the gen. plu. in ᾶν, gen. sing. masc. in α (πολιτᾶν, πολίτα = Att. πολιτῶν, πολίτου); (3) μες, for μεν, in first pers. plu., ντι in third pers. (ἥκομες, ἔχοντι = Att. ἥκομεν, ἔχουσι); (4) formation of the future in σέω, σῶ; (5) contraction of αε to η. A special group of dialects (sometimes called Northern Doric) is to be recognized in the inscriptions of Phocis, Locris, and the neighboring districts.

Æolic.—The dialect of Æolis (Northern Asia Minor). With this are commonly grouped the dialects of Bœotia and Thessaly, although they differ from it in many particulars. The poems of Alcæus and Sappho were written in Æolic, as well as three idyls of Theocritus. The dialect is characterized by (1) an objection to oxytones (κάλος, σόφος, αὔτος = Att. καλός, σοφός, αὐτός); (2) frequent objection to an initial rough breathing (ἕτερος, ὔμμες = Att. ἕτερος, ὑμεῖς); (3) instability of vowel sounds, combined with a fondness for ι and υ sounds (πίσυρες, ὄνυμα = Att. τέτταρες, ὄνομα); (4) preference for οι instead of ου where both arose from original ον (λίποισα, τοῖς = Att. λιποῦσα, τούς). The closely related group of Arcadian and Cyprian was formerly classified as Æolic, but is now placed in a separate category by conservative scholars.

Relation to the Primitive (Indo-European) Language. The Greek vowels usually represent similar sounds in the parent language. In many cases, however, they are of secondary origin, notably the characteristic Ionic and Attic η, which not only represents orig. ē (μήν = Lat. *mensis*), but also orig. ā (Att. φηγός = Dor. φᾱγός, Lat. *fagus*). Short α before or after λ, μ, ν, or ρ is often derived from an original sonant liquid or nasal (πατράσι = Skt. *pitṛ-šu*). The diphthongs αι, ει, οι, αυ, ευ, and ου often represent corresponding sounds in the parent language (οἶνη, Lat. *oinus, ūnus*; αὐξάνω = Lat. *augeo*); often, however, they are the result of a chance concurrence of two vowels, frequently due to the loss of an intervening consonant (εἰ, from ἐ[σ]ι). At the end of words ᾳ, ῃ, and ῳ represent original long diphthongs (χώρᾳ, ἵππῳ); elsewhere they are of secondary origin (ῥᾴδιος, from ῥᾱΐδιος, σῳζω, from σωΐζω). Apparently ηυ and υι were not original, but new formations during the independent existence of Greek. Often ει and οι are not true diphthongs at all (see below). Of the consonants, β, γ, δ, π, κ, τ, and σ usually represent the same sounds in the parent language. φ, χ, θ usually represent orig. *bh, gh,* and *dh* (φέρει, χειμών, τίθημι = Skt. *bhárati, himá, dadhāmi*). The liquids λ and ρ correspond, as a rule, to I. E. *l* and *r* (ἀρόω, κλύω = Lat. *aro, cluo*); μ and ν are commonly equivalent to I. E. *m* and *n*, although at the end of words ν frequently represents orig. *m* (ζυγόν = Skt. *yugám*, Lat. *jugum*). Initial ζ = *j* (cf. ζυγόν), but ζ usually represents a combination of δ or γ with ι; ξ and ψ are simply conventional symbols for a palatal (κ, γ, χ) or a labial (π, β, φ) mute with σ. ϝ, when it appears, represents I. E. *v*, Eng. *w* (ϝοῖκος Skt. *vesá*, Lat. *vīcus*). The rough breathing never corresponds to I. E. *h*, but often marks the loss of one or more consonants (ἅλς = Lat. *sal*, Eng. *salt*; ἡδύς, orig. *σϝαδυς = Lat. *suadvis, suavis*, Eng. *sweet*).

Phonetic Changes. Many changes in the form of Greek words are to be traced to phonetic causes. The most important of the changes are: (1) *Loss of consonants.* ϝ, although retained in some dialects until comparatively late times, shows a constant tendency to disappear (οἶνος, orig. *ϝοινος, cf. Lat. *vinum*; εἶδον, orig. *ἔϝιδον, Lat. *vidi*); σ disappears at the beginning of words and between vowels (ἑπτά = Lat. *septem*, γένους, from *γενεσος, through *γενεος = Lat. *generis*); even σϝ has disappeared in some cases (ἱδρώς = Lat. *sudor*, Eng. *sweat*). At the end of words, consonants are often lost, owing to the law that only ν, ρ, and σ can terminate a word (nom. ἄρχων, from stem ἀρχοντ-); τ, δ, and θ, regularly disappear before σ (ἐλπίς, for *ἐλπιδ-ς); as well as ν (δαίμοσι, for *δαιμον-σι), and the combinations ντ, νδ, νθ (γίγας, for γιγαντ-ς). (2) *Change of consonants.* The combination of a consonant and ι (representing an original semi-consonant *i*) is the cause of many changes: δι becomes ζ (φράζω for *φραδιω); κι and χι become σσ, Att. ττ (φυλάσσω, Att. φυλάττω, for *φυλακιω); γι becomes sometimes σσ (τάσσω for *ταγιω), sometimes ζ (κράζω for *κραγιω); λι becomes λλ (ἄλλος for *ἄλιος = Lat. *alius*); νι and ρι become νν and ρρ, with subsequent loss of one consonant and lengthening of the preceding vowel (Lesbian κτέννω, φθέρρω, Att. κτείνω, φθείρω, for *κτενιω, *φθεριω), or else the ι is lost, and the preceding vowel is strengthened by the addition of an ι (the so-called epenthesis, i.e. φαίνω, for *φανιω). The vowel ι sometimes changes a preceding τ to σ (φέρουσι, Dor. φέροντι = Lat. *ferunt*). Before μ, — π, β, and φ become μ (λέλειμμαι for *λελειπ-μαι); κ and χ become γ (πέπλεγμαι, for *πεπλεκ-μαι); τ, δ, and θ become σ (πέπεισμαι for *πεπειθ-μαι). The combinations μρ and μλ are strengthened by the insertion of β (μέμβλωκα for *μεμλωκα); and νρ is strengthened by the insertion of δ (ἀνδρός for *ἀνρος); at the beginning of a word, such μ or ν is dropped (βροτός for *μβροτος, cf. Lat. *morior*). (3) *Loss of vowels.* ι sometimes becomes consonant (*j*) and is then lost (Ἀθηνάα for Ἀθηναία). So, too, υ between two

vowels becomes ϝ, and disappears (βοός for *βοϝος, from stem βου-, Lat. *bovis*). (4) *Contraction of successive vowels* is frequent, and in Attic regularly takes place (τιμῶ for τιμάω). The contraction of εε, εο, οο, οε, produces the so-called spurious diphthongs ει and ου, which were, in early times, at least, spoken and written as simple sounds. (5) *Compensative lengthening of vowels.* When one or more consonants are dropped for euphony (especially before σ), a preceding vowel is often lengthened (μέλᾶς for *μελαν-ς). The diphthongs ει and ου which arise from this process are also spurious, being simply lengthened forms of ε and ο (λύουσι for *λυοντσι). (6) *An exchange of quantity* sometimes takes place between a long vowel and a succeeding short one (epic νᾶός, βασιλῆος, Att. νεώς, βασιλέως).

Inflection. *Nouns.*—Of the eight original Indo-European cases, the Greek has preserved five: nominative, genitive, dative, accusative, and vocative. The locative, instrumental, and ablative cases are preserved only in a few adverbial forms, their functions being performed by the genitive and the dative. There are three declensions of nouns, according as the stem ends in α (first declension), ο (second declension), or a consonant, a diphthong, or a close vowel (third declension). For the α and ο stems the oldest endings are—sing. nom. ς (but feminines in α have no ending), gen. (σ)ιο, dat. αι, acc. ν; plu. nom. ι, gen. ων, dat. ισι, acc. νς. For consonant and close vowel stems, the endings are—sing. nom. ς, gen. ος, dat. ι, acc. ν or α; plu. nom. ες, gen. ων, dat. σι, σσι, or εσσι, acc. νς or ας. Vocatives proper have no ending. The dual, which is preserved in Greek (although it shows a constant tendency to fall into disuse) has the endings α and αιν for the first declension, ω and οιν for the second, ε and οιν for the third. The origin of these forms is uncertain. Neuters from ο stems form the nom. acc. and voc. sing. by adding ν; in stems of the third declension, these cases are without ending. The nom., acc., and voc. plu. of neuters ends in α. Many of the phonetic changes noted above are the result of the combination of stems with endings. *Pronouns.*—The pronouns that distinguish gender (demonstrative, relative, and interrogative pronouns) are inflected like nouns, with some slight variations. The inflection of the personal pronouns which do not distinguish gender differs from that of nouns in many ways, which cannot be discussed here. The stems of the personal pronouns are—singular, first person ἐμε (cf. Lat. *me*), second person σε (*te*), third person ἑ (σε): dual, first person νω (*nos*), second person σφω, third person wanting; plural, first person ἡμε, second person ὑμε, third person σφε. The nominative singular forms, ἐγώ, σύ of the first and second persons are from separate stems (cf. Lat. *ego, tu*). The definite article ὁ, ἡ, τό, corresponds to the Sanskrit *sas, sā, tat*. *Verbs.*—The Greek verb is one of the most highly developed parts of the language. Not only has the Greek preserved more completely than any other of the Indo-European languages the verb system of the parent language (its only rivals in this respect being the Indo-Iranian and the Slavic groups), but it has added to that system a number of forms of its own. Besides the active and the passive, the Greek finite verb has a third voice, the middle, which represents the subject as acting on or for itself. It has seven tenses, present, imperfect, future, aorist, perfect, pluperfect, and future perfect. It is thus enabled to express by distinct forms momentary, continued, and completed past action (by the aorist, imperfect, and pluperfect tenses respectively). It has forms for the dual, as well as for the singular and the plural. Besides the indicative and imperative, the Greek verb has two oblique moods, the subjunctive and the optative, with separate forms for continued, momentary, and completed action. There is also a future optative, used to represent only the future indicative in indirect discourse. Characteristic of past tenses is the augment (prefixing of ε to the verb stem or lengthening of the initial vowel). The perfect and the pluperfect are distinguished by reduplication—primarily a repetition of the initial syllable. The present and imperfect are often formed by a strengthening of the verb stem. All tenses, except the future and the so-called first aorist, exist in two forms, called respectively thematic and non-thematic (or ω conjugation and μι conjugation), according as the tense stem and the personal endings are or are not connected by the 'thematic vowel' appended to the stem. There are two sets of personal endings for both active and middle. These vary somewhat in different dialects, and in the active singular have often been affected by analogy, but in general the distinction in use is observed with considerable strictness, as follows: For pres., perf., fut., and subj.,—active sing. μι, σι, τι, dual τον, plu. μεν, τε, ντι; middle sing. μαι, σαι, ται, dual σθον, plu. μεθα, σθε, νται. For imperf., aor., plup., and opt.,—active sing. ν, ς, τ, dual τον, την, plu. μεν, τε, ντο; middle sing. μην, σο, το, dual σθον, σθην, plu. μεθα, σθε, ντο. Except in the aorist and the future, the passive forms coincide with those of the middle. The addition of these endings to the verb stem, whether with or without intervention of the thematic vowel, often causes phonetic changes under one or another of the phonetic laws stated above.

Word Formation. The Greek possesses a great variety of terminations by which nominal stems are formed from roots, although it is often impossible to assign a single meaning to each of these suffixes. The most important are—, ο, α, ι, υ, κο, λο, μο, νο, ρο, ϝο, ιο, (and corresponding forms ending in α), ας, ες, εν, ον, τηρ, τορ, and various combinations of these forms. Besides such primary formations, secondary forms, i.e. nouns (and adjectives) derived from other nouns, are common. The commonest suffixes of such denominative nouns are ευ, τα, τητ, συνα, ια, ιο, ισκο; of denominative adjectives εο, ιο, ικο, ινο, εντ. The comparative suffixes are ιο and τερο, the superlative ισκο and τατο. Denominative verbs are freely formed; the commonest endings of such verbs are αω, εω, οω, ευω, αζω, ιζω, αινω, υνω. In compound words, two or more stems are combined, only the last being inflected. Except in compounds made for comic effect, the combination of more than two roots is unusual.

Later History. The conquests of Alexander the Great (B.C. 330) and the consequent spread of the Greek language over a great part of Asia led to the gradual abandonment of the other dialects and the adoption of Attic as the language of the whole Greek world. Thus arose the 'common' dialect (κοινὴ διάλεκτος), a slightly modified Attic, tinged with the peculiarities of the peoples by whom it was spoken. This common dialect is sometimes called Hellenistic Greek, i.e. the Greek spoken by foreigners (Ἑλληνισταί), not by native Greeks (Ἕλληνες). The Greek of the Septuagint (q.v.)

and of the New Testament furnishes a good example of this Hellenistic Greek. It is the language of Aristotle, Polybius, Pausanias, Plutarch, and Lucian. The pronunciation was changed even more than the form of the language. As early as the third century, B.C. ει came to be sounded like ι; ζ was pronounced like Eng. *z*. In the early Christian centuries η also assumed the sound of ι; αι came to be pronounced like simple ε. The diphthong οι was sounded like υ and later both were sounded like ι. The diphthongs ending in υ modified or lost their second vowel. β, γ, and δ were softened in sound. During all this time the literary language continued to follow Attic models, but by A.D. 800 the difference between the spoken and the written language had become so great that the literary language could no longer maintain itself, and was gradually supplanted by the spoken language. With this date, therefore, the period of modern Greek may be said to begin.

BIBLIOGRAPHY. The most complete Greek grammar is that of Kühner, *Ausfuhrliche Grammatik der griechischen Sprache*, revised by Blass and Gerth (Hanover, 1890-98). Historical grammars are those of Brugmann, in Müller, *Handbuch der klassischen Altertumswissenschaft*, vol. ii. (3d ed., Munich, 1900); Meyer (3d ed., Leipzig, 1896); Kretschmer, *Einleitung in die Geschichte der griechischen Sprache* (Leipzig, 1897); Hirt, *Laut und Formenlehre der griechischen Sprache* (Heidelberg, 1902). Good working grammars in English are those of Goodwin (Boston, 1892), and Hadley, revised by Allen (New York, 1875). Useful for syntax are Madvig, *Syntax der griechischen Sprache* (Brunswick, 1884), and Goodwin, *Greek Moods and Tenses* (Boston, 1900). Special works on the dialects: Ahrens, *De Græcæ Linguæ Dialectis* (Göttingen, 1839-43); Meister, *Die griechischen Dialekte* (ib., 1882-89); Hoffman, *Die griechischen Dialekte in ihrem historischen Zusammenhange* (ib., 1891-98); Smith, *Sounds and Inflections of the Greek Dialects*, vol. i. *Ionic* (Oxford, 1894). There is no general treatment of the 'common' dialect, but Thumb, *Die griechische Sprache im Zeitalter des Hellenismus* (Strassburg, 1901), is useful as an introduction to the subject. The best lexicon is that of Liddell and Scott (8th ed., Oxford, 1897).

THE GREEK LANGUAGE, MODERN.—The differences between ancient and modern Greek are by no means so great as has commonly been supposed, the modern language being a direct descendant of the 'common' dialect (vide supra). The beginnings of most of the changes that have affected modern Greek can be traced back into the Hellenistic period. Some of these changes have been noted above. Others are as follows: The ancient marks of accent have been retained, but they no longer represent a difference of pitch; the accent is a stress accent, exactly like that of English (traces of this change can be seen as early as A.D. 400). The rough breathing is still printed, but is no longer pronounced. Etacism has extended its influence until no fewer than six different vowels and diphthongs have the sound of ancient ι—namely, ι, η, υ, ει, οι, and υι. The dual number has entirely disappeared, and the middle voice appears in only a few isolated forms. In the language of the common people, the dative case is practically lost, its place being supplied by the genitive or the accusative with a preposition. Great numbers of nouns have taken the diminutive ending ιον, which in the vernacular is reduced to ι, and the loss of a syllable at the beginning of words is not infrequent; so τυρί, cheese = τυριόν, τυρός; ψάρι, fish = ὄψον, through ὀψάριον; μάτι, eye = ὄμμα. In many nouns, moreover, the accusative is taken as a new nominative: so ὁ πατέρας = πατήρ.

But it is in the conjugation of the verb that the greatest changes have taken place. Here the optative has entirely disappeared and the infinitive survives only in a mutilated form. The ancient uses of both are supplied by the subjunctive: ὑπῆγα διὰ νὰ τὸν ἴδω = ἦλθον ἵνα αἴ τὸν ἴδοιμι; θέλω νὰ ἔλθω = θέλω ἐλθεῖν. The future, the perfect, and the pluperfect are formed by the aid of auxiliaries: θὰ (θέλω ἵνα) λύω or θὰ λύσω = λύσω; ἔχω λύσει = λέλυκα; εἶχα λύσει = ἐλελύκη. The pronouns have suffered many changes. The awkward ἀποῖος, or even the adverb ποῦ is used in place of the relative.

The vocabulary also has suffered from the intrusion of loan words from other languages, notably from Italian and Turkish, although the infusion has not been so great as to give the language the appearance of a mixed language; cf. σπίτι (Latin *hospitium*), house; βαπόρι (Ital. *vapore*), steamer; δερβένι (Turkish *derrend*), pass. Since the establishment of the Greek kingdom (1830), there has been a stronger movement toward the purification of the modern language and a closer conformity to the ancient Greek idiom. This has resulted in a curious gap between the literary language and the common speech, not unlike that which existed in the later classical times. The new movement, however, has made steady progress, and it is not too much to say that the modern Greek newspaper would be easily intelligible to Plato and Demosthenes.

The best Modern Greek grammars are those of Mitsotakis, *Praktische Grammatik der neugriechischen Sprache* (Stuttgart, 1891), and Pernot, *Grammaire grecque moderne* (Paris, 1897). In English, Vincent and Dickson, *A Handbook to Modern Greek* (London, 1893), is good for the literary language; and Gardner, *A Modern Greek Grammar* (London, 1892), for the spoken language. Hatzidakis, *Einleitung in die neugriechische Grammatik* (Leipzig, 1892), treats especially the relation of the modern language to Hellenistic and Byzantine Greek.

The best dictionaries are those of Kontopulos (3d ed., Athens, 1889), and Kyriakides (Nicosia, Cyprus, 1892). Useful, also, are Sophocles, *A Greek Lexicon of the Roman and Byzantine Periods* (New York, 1887), and Ducange, *Glossarium ad Scriptores Media et Infimæ Græcitatis* (Leyden, 1688; reprinted Breslau, 1891).

GREEK LITERATURE. The literature of ancient Greece is important, not only because it is the earliest literature in Europe, and the one which has had a mastering influence on all the others, but also for the intrinsic value of its remains, which prove it one of the greatest of all literatures. The Greeks possessed no models for their guidance, as later peoples have had, so that their literature is an original and natural development; in it were determined most of the literary types employed by European peoples. Fortunately, the remains of this ancient literature are large enough to enable us to trace the history of its various forms with a considerable degree of accuracy.

We can distinguish six natural divisions: (1) The Age of Epic Poetry; (2) The Lyric Period;

(3) The Attic Period; (4) The Alexandrian Age; (5) The Graeco-Roman Period; (6) The Byzantine Period.

(1) THE AGE OF EPIC POETRY. This extends to the sixth century B.C. At the threshold of Greek literature we find two indefectible products of Greek genius, the *Iliad* and the *Odyssey*. But the very perfection of these poems shows that, far from being early efforts of a people unskilled in poetic composition, they represent the culmination of a long development in the art; furthermore, the contents prove that at least two, and probably three, kinds of poetic composition had been practiced from an unknown period. The earliest artistic compositions were probably hieratic in character; that is, they formed part of the service of the gods. The earliest singers were 'servants of the Muses,' the goddesses who dwelt with the other celestials on Olympus in Thessaly. With the migrations of the Hellenic tribes to the south, a new centre of the Muses' worship developed on Helicon, between Bœotia and Attica. Tradition gave the names of certain mythical singers, among whom the most famous were Orpheus, Musæus, Eumolpus, and Thamyris. Closely connected with hymns in honor of the gods were the hymeneal song and dirge for the dead, both of which were known to Homer. There also developed, among the different stocks, sagas celebrating the exploits of hero-princes who led their peoples in warlike undertakings; and the material for epic song was greatly enriched by the great struggles and movements at the end of the second millennium B.C., consequent on the migrations of Thessalian and Dorian peoples toward the south. It is clear from the two great epics preserved to us that a long period had preceded them in which shorter epics had been sung by minstrels at courts and in the market-place. In these epics of the different tribes, the deeds of the national heroes were celebrated—of Achilles among the Æolians, of the Atridæ among the Achæans; among the Dorians the favorite subject was the exploits of Heracles. The struggle of the Seven against Thebes, the voyage of the *Argo*, and the siege of Troy were other frequent themes. To the Trojan cycle of legends, probably the youngest of all, belong the *Iliad* and the *Odyssey*. The story of the siege of Troy has as its historical basis the struggles of the Æolian colonists in Asia Minor with the earlier Phrygian inhabitants. In the *Iliad* the chief figure is Achilles, the hero of the Æolians, native in Southern Thessaly. With the story of his deeds were combined shorter epics treating the deeds of other heroes. The whole is an incident in the tenth year of the war; the action covers but forty-nine days. The *Odyssey* belongs to the cycle of myths dealing with the return of the heroes from Troy. Although the action is confined to forty-one days, the composer, by his skillful device of having Odysseus tell the story of his wanderings at the court of the friendly King of the Phæacians, has succeeded in giving us a complete account of the hero's adventures during the ten years after the fall of Troy, as well as the narrative of his dramatic return to his home.

In antiquity these immortal poems were ascribed to a blind bard, Homer; but among the learned of the Alexandrian Age some claimed that the two epics were not by the same poet. In modern times the 'Homeric Question' has been a burning one since the publication of Wolf's *Prolegomena* in 1795. (For an account of the controversy, the work done on the poems at the orders of Pisistratus, and the details of the general subject, reference must be made to the article on HOMER.) Conservative opinion now inclines to regard the poems as works of the same poetic school, and each in the main the creation of a single poet who drew freely on current epics, many of which may well have come into existence long before his time. That the poems have suffered from later interpolations is certain. The date of composition is the ninth or eighth century B.C.; the place of origin was apparently Western Asia Minor, on the borders of Æolis and Ionia.

These two great epics covered but a portion of the legends about the Trojan War. Other parts were treated by an Ionian school of epic poets which flourished from the eighth to the sixth century B.C. These bards—known in modern times as the cyclic poets—joined their poems to the *Iliad* and the *Odyssey* as introductions or continuations. Of their works we have only the scantiest fragments and some prose abstracts. Other cycles of myths than the Trojan were handled by later epic poets, but of their works we have little knowledge.

There has further been preserved to us a collection of thirty-four Homeric hymns, in honor of various divinities. These are not hymns in the strict sense of the word, but rather preludes for rhapsodists before beginning their proper recitals. The name is misleading, as they have nothing to do with Homer, but are the product of a later time; the earliest, the hymn to the Delian Apollo, can hardly have been composed before the latter part of the eighth century B.C., and the latest is not earlier than B.C. 500.

There were also current under Homer's name some sportive species composed in epic form. The most famous are the *Margites*, of which we have a few lines, and the *Batrachomyomachia* (*Battle of the Frogs and Mice*), of which some three hundred verses are preserved. It is one of the earliest examples of parody in Greek literature. Scholars disagree as to its date, some placing it as early as the Persian wars, others regarding it as a product of the Alexandrian Age.

The other great poet of the first period is Hesiod of Ascra, in Bœotia, near Mount Helicon, who flourished toward the end of the eighth century B.C. The Hesiodic poetry is distinguished from the imaginative Homeric epics primarily by its homely character; the chief poem, the *Works and Days*, deals with the daily life of the farmer, and gives him directions for his work. It is the earliest didactic poem known to us. Other works ascribed to Hesiod—the *Theogony* and the *Shield of Heracles*—are of doubtful authenticity.

(2) THE LYRIC PERIOD. *Elegiac and Iambic Poetry.*—Important economic and social changes took place in Greece during the period from the eighth to the fifth century B.C. Increase of population and development of manufactures led to the planting of Greek colonies all along the shores of the Mediterranean and Black seas; and within most of the home cities the government passed successively from monarchy to oligarchy, then to tyranny and democracy. The old preëminence of the aristocracy was greatly diminished, and a powerful moneyed class developed. With these changes the importance of the individu-

al increased, knowledge was enlarged, and above all, reflective thought began to demand a larger poetic expression than had been given it before. New poetic forms, the elegiac and iambic, were developed in Ionia. The elegiac couplet was a slight modification of the hexameter, and the older poetry composed in this measure was always accompanied by the music of the flute. While early elegy dealt with a great variety of themes, it was always the expression of the thoughts and feelings of the poet himself, and never so passionate as iambic verse. This latter was first employed for satire, its quick movement suiting it to the expression of pointed thought and of more passionate feeling than the elegiac measure. It was also used for fables.

The ancients disputed as to whether Archilochus, Callinus, or Mimnermus was the inventor of the elegy; but Callinus of Ephesus, who flourished in the first half of the seventh century B.C., is usually reckoned the earliest of the elegiac poets. He employed the measure to encourage the Ionians in resistance against the barbarian invaders of their land. Tyrtæus, about a generation later, was probably an Ionian immigrant to Sparta, who by his verses inspired the Lacedæmonians to fight against the Messenians. Mimnermus of Colophon, who flourished toward the end of the seventh century, introduced new elements —love and sentimentality—into elegy, and therefore became a favorite with the Alexandrians and Romans. Solon (c.639-c.559 B.C.), the great lawgiver of Attica, used the measure after the manner of Callinus and Tyrtæus to incite the Athenians against the Megarians, and later to celebrate the reforms he had carried through. In the hands of Theognis of Megara (c.540 B.C.), of whose works some 1400 verses are extant, elegy became the medium of moral precepts; it was employed for the same purpose also by his contemporaries Phocylides of Miletus and Demodocus of Leros. At the end of this century Xenophanes of Colophon employed elegy to express his philosophic thought. From the time of Simonides of Ceos (B.C. 480), famed chiefly as a lyric poet, elegy became the regular form for epitaphs.

Iambic verse was first brought to perfection by Archilochus of Paros (c.650 B.C.), who employed it with masterly power as a vehicle of personal satire. He was followed by Simonides of Amorgos, whose satire was general rather than personal. Hipponax of Ephesus (c.540 B.C.) was called the inventor of parody. By substituting a trochee for an iamb at the end of the verse, he modified the iambic line into the choliambic measure, in which he gave out the venom of his hate.

Lyric—or, as the Greeks called it, melic—poetry was inseparably connected with music. The metres employed show great variety; and many forms of lyric poetry developed, differing according to the purpose of the poem and the method of its rendition, whether by an individual or by a choral band. Tradition said that Terpander (c.675 B.C.) made a great development in music, possibly by adding three strings to the four previously employed on the lyre; he also developed new measures. The greatest of the early lyric poets were the Æolians, Alcæus and Sappho of Mitylene (c.600 B.C.). The former's lyrics covered a wide range of subjects, from political themes to the praise of love and wine. Sappho, the single great poetess of Greece, made her verse express her own fierce passions. Anacreon of Teos (c.530 B.C.) wrote in the Ionian dialect in praise of pleasure and sensuous delights. There were also many poets of choral lyric among the Dorians; the most important were Alcman (c.630 B.C.), who introduced lyric forms into Sparta, and, according to tradition, developed the strophic structure of choral songs. Arion (c.600 B.C.) gave the dithyramb a finished form, and Stesichorus of Himera (c.640-555 B.C.) cultivated lyric poetry in Sicily and contributed to the development of the form of the choral ode. He went beyond the usual province of lyric poetry in that he ventured to handle epic themes. Ibycus of Rhegium (c.540 B.C.) followed Stesichorus closely. Simonides of Ceos (B.C. 556-468) was of great importance for the history of lyric poetry, for, combining the strength of Ionian genius with Dorian art, he addressed his lyrics to all Greeks, and so gave this branch of poetry a universal character. His nephew, Bacchylides, who flourished in the first half of the fifth century B.C., like his uncle at one time a resident at the Court of King Hiero of Syracuse, was famed for his hymns and odes, recently made known in part to us by an Egyptian papyrus. But the greatest of all the lyricists was Pindar (B.C. 522-442), a native of Thebes, yet in spirit and genius a national poet, whose extant hymns of victory attest his greatness. Pindar covered almost every province of lyric poetry, and marks the culmination of this art in Greece.

(3) The Attic Period. The prestige which Athens gained in the Persian wars, and the power and wealth which her sea empire brought, soon made her the most prominent State in Greece. At the same time she became the centre of the Greek intellectual life, and maintained this position until the close of the fourth century.

The first great literary development of the fifth century was the drama. Tragedy and comedy alike had their origin in the worship of the god Dionysus, the former, as Aristotle says, developing from the dithyramb, the latter from the license of the phallic song. Tradition made Icaria, an ancient centre of the worship of Dionysus in Attica, the birthplace of Attic drama, and named Thespis as the inventor of tragedy. The date given for the first tragic production is B.C. 534. From the end of the sixth century the State undertook the expense of the tragic choruses. Of the other tragic poets of the earliest period, Phrynichus (6th-5th cent.) most deserves mention. While the drama had as yet but a single actor, so that action in the proper sense of the word was impossible, still the extant titles show that Phrynichus handled a variety of themes. In the *Capture of Miletus* he introduced the handling of contemporary themes, followed by Æschylus in his *Persians*.

It was Æschylus (c.525-456 B.C.), however, who developed tragedy from a succession of narrative scenes to a play of action by the introduction of a second actor. The dialogue now became of more importance than the choral songs, whereas the opposite had been the case in the earlier period. Æschylus was nobly born, and was deeply stirred by the dangers which threatened the Greeks from the Orient. He was a poet of the highest order, and a most profound thinker, while his moral and religious feeling was genuine and intense. Many of his conceptions have a

grandeur almost unparalleled in literature. Of the ninety plays which he is said to have written, but seven have been preserved; among them, however, the single extant trilogy, the *Orestea: Agamemnon, Choephori*, and *Eumenides*. The *Agamemnon* is regarded by many as the greatest Greek tragedy extant.

Sophocles (c.496-406 B.C.) was the greatest artist among the tragedians of the century. His conceptions lack the grandeur of those of Æschylus, and he is less humanly pathetic than Euripides, but excels both in representing the great human emotions. His characters are always lofty and noble. He is further the interpreter of the highest ideals of the age of Pericles, and he must always be interpreted as such. By introducing a third actor he gave tragedy its final form. Of more than 120 plays which were attributed to him, we have but seven. Of these, the *Œdipus Tyrannus* is the greatest; in the opinion of many critics it rivals the *Agamemnon* of Æschylus for the first place among ancient tragedies.

Euripides (B.C. 480-406), in contrast to his older contemporary, represents Athens in transition from the age of Pericles to the new conditions of the fourth century; with him the decline of tragedy is usually said to begin. Although it is true that he is the last of the great tragedians, we can more correctly hold that he represents the last stage in the development of ancient tragedy, and marks the way to the later drama. Tragedy in his hands lost much of its ideal character and came down to earth: his heroes talk and act like ordinary men; his language, too, approached that of every-day life. While he was bitterly attacked by Aristophanes, the mouthpiece of the ultra-conservatives, he still enjoyed even during his lifetime the high reputation he deserved. In tender pathos he was unexcelled, as well as in the representation of love and hate, and many scenes in his dramas are unequaled. Yet in the management of his plots he was inferior to his predecessors. Euripides left 92 plays, of which we have 18, including the *Cyclops*, the unique extant example of a Satyr play. The *Rhesus*, which is found with these plays in the manuscripts, is generally regarded as spurious. Among the best of his plays are the *Medea, Hippolytus, Bacchæ*, and *Iphigenia at Aulis*.

As has been said above, comedy also developed in connection with the worship of Dionysus. Tradition said that Megara was its first home, and that Susarion (c.580 B.C.) transplanted it to Attica. It came to perfection on Athenian soil more slowly than its sister art tragedy; the State did not undertake the expense of it until about B.C. 470. In the meantime Epicharmus (c.480 B.C.) brought a form of comedy to high development in Sicily, and undoubtedly influenced Athenian writers.

Attic comedy is divided into three periods—Old Comedy (sixth century B.C. 400); Middle Comedy (B.C. 400-336); New Comedy (B.C. 336-250). The comic poets at Athens in the early fifth century, Chionides, Ecphantides, and Magnes, are little more than names to us. The great poets of the Old Comedy were Cratinus (died c.421 B.C.), Eupolis (died c.411 B.C.), and Aristophanes (c.450-385 B.C.). Only fragments of the comedies of the first two are extant; of the plays of Aristophanes, the greatest of the three, we have eleven complete, covering the period B.C 425-388. These exhibit the great genius of their writer, his keen wit and stinging satire, as well as his mastery of broad burlesque; and also show him to have been a lyric poet of marvelous sweetness. They further mirror the changing social and political conditions of the time in which they were produced. In the earlier plays the prevailing theme is the sharpest personal and political satire; in the middle group there is much greater reserve; and in the last plays personal and political attack is abandoned for literary and social satire. This tendency, with the gradual decay of the chorus, marks the transition to the Middle Comedy. In this the choral element was insignificant, and the themes were frequently philosophical and literary criticism, parodies of myth—one of the stock subjects from the earliest period also—and social satire. The chief names in this period are Antiphanes, Anaxandrides, and Alexis. The New Comedy was distinctly a comedy of manners, with stock characters and situations. The most important poets were Philemon (B.C. 361-263), Diphilus, and above all Menander (B.C. 342-291). The strength of this comedy was in the fine delineation of character, smoothness of verse, and fineness of wit. Of it, as of the Middle Comedy, no play has been preserved complete; but the adaptations of Plautus and Terence with the extant fragments enable us to reconstruct its general characteristics.

The Greek drama had reached its full development before a prose literature in the strict sense of the word appeared. The earliest literary prose was used in Ionia, the birthplace of artistic Greek poetry. In the middle of the sixth century B.C. Pherecydes of Syros set forth his philosophical doctrine in prose; Anaximenes and Anaximander also employed the same vehicle. Toward the close of the sixth century there also appeared in Ionia the beginnings of historical writing. The earliest historians were called *logographoi*, writers of prose, to distinguish them from *epopoii*, the writers of epic verse. They compiled genealogies, myths, and legends, and recorded the history of the founding of cities, the customs and institutions of various peoples, both foreign and Greek. Cadmus of Miletus was the earliest of the logographers; Hecatæus belonged to the period of the Persian wars. Others were Acusilaus, Xanthus, and Pherecydes of Leros. With Hellanicus of Mitylene (c.450 B.C.) more careful work began. He was a prolific writer, both on chronology and on the history of many States in Greece. But the title of 'the father of history' belongs to Herodotus (c.484-c.425 B.C.). A native of Halicarnassus, born of a rich and noble family, he was a great traveler in Egypt, the remote East, and over most of the Greek world. He visited Athens twice, resided and probably died at Thurii, in Southern Italy. His history was based on the material he collected in his travels and on the work of his predecessors. His purpose was to present a record of the dramatic struggle between Greece and Persia; as introduction to his main theme he traced the rise and growth of the Persian Empire. In doing this he gave an account of the geography, history, and customs of Persia, Egypt, Libya, Babylonia, Thrace, and Scythia. The last four of his nine books relate the invasion of Greece by Darius and Xerxes. Herodotus was lacking in critical sense, did not go beneath the surface in seeking the causes of events, and had no interest in constitutional history. Yet his narrative of facts is usually cor-

rect. His real distinction is based on the fact that he was the first to compose a great historical work with unity of plan, and to bring large masses of facts into an ordered whole.

The founder of philosophical history was Thucydides (c.455-c.400 B.C.). His history of the Peloponnesian War from its beginning to B.C. 411—he did not live to complete it—is an attempt to give an accurate and concise record of events; it also shows deep study of causes and a careful investigation of facts. The account is dispassionate and impartial; certain passages are unsurpassed in their nobility and stern pathos. While we may regret Thucydides's neglect of social conditions, his work is one of the greatest histories ever written. Xenophon (c.434-c.355 B.C.) continued Thucydides's work in his *Hellenica* to the battle of Mantinea. Xenophon was the author of many other works, of which the most important are his *Anabasis*, an account of the expedition of Cyrus the Younger and of the successful retreat of the 10,000 Greeks from the heart of the Persian Empire; the *Cyropædia*, an historical romance with Cyrus the Great as its hero; and the *Memorabilia*, a report of the teachings of Socrates. In his minor works Xenophon appears as the first Greek essayist.

Among the later historical writers, none of whose works are preserved, must be named Ctesias, the real founder of Oriental history in Greek; Theopompus (c.380-c.315 B.C.), and Ephorus (flourished c.350 B.C.), who introduced the rhetorical method of historical composition. From about B.C. 360 several writers known as the Atthids devoted themselves to Athenian history and archæology.

Athenian oratory received a powerful impulse from the teachings of the Sophists, of whom Protagoras and Prodicus were the chief, and was also greatly influenced by Sicilian rhetoric, which Gorgias of Leontini introduced in B.C. 427. In the canon of the ten Attic orators, Antiphon (c.480-11) holds the earliest place. His speeches retain the character of the older oratory, and have much in common with the speeches Thucydides has placed in his history. The next three are Andocides (born c.440 B.C.), Lysias (c.450-380 B.C.), and Isocrates (c.436-338 B.C.). Of these, Lysias shows the perfection of the simple style, while that of Isocrates is more ornate and rhetorical. The latter's prose became the literary standard from the middle of the fourth century. Isæus (c.420-350 B.C.), the pupil of Isocrates, won his chief fame in cases of inheritance. All the preceding, however, were surpassed by Demosthenes (B.C. 383-22), who by his complete mastery of language and rhetoric, and still more by his originality, his political insight, and his ardent zeal for the freedom of his native State, is the greatest orator, not only of all Greece, but of all history. His heroic, though fruitless, struggle to save Greece from subjection by Macedon, which he saw impending, is a splendid example of what can be accomplished by the genius of one man. Æschines (B.C. 389-14), the great rival of Demosthenes, was second to him alone in eloquence, while Lycurgus, Hyperides, and Dinarchus were less famous contemporaries.

Although the early Ionian philosophers had in some cases reduced parts of their doctrines to writing in both prose and verse, and the Eleatics, Xenophanes and Parmenides, and also Empedocles, composed long philosophical poems, little is left of their works. The same is true of the famous work *On Nature* by Anaxagoras (born c.500 B.C.), who transferred philosophy from Ionia to Attica. Socrates left no writings. The literary history of Athenian philosophy, therefore, begins with Socrates's greatest pupil, Plato (c. 427-347 B.C.), the founder of the Academic School, although others—e.g. Æschines, Euclid of Megara, Phædo, and Antisthenes—composed works which reflected the manner and teaching of their master. Plato was born of a noble and rich family, traveled widely, and was for ten years the disciple of Socrates. He was endowed with a remarkable poetic imagination, and had attained a charming and flexible style which lies between prose and poetry. In all, 42 dialogues are extant under his name, of which 35 are probably genuine. The *Republic*, *Phædo*, and *Gorgias* are perhaps the greatest.

Plato's pupil, Aristotle (B.C. 384-22), the founder of the Peripatetic School, was the first to apply a rigidly scientific method to investigation. He sought to map out the provinces of human knowledge, and to show the principles underlying each and the problems with which each was concerned. He was the founder, in a strict sense, of scientific rhetoric, logic, political science, and natural history. His genius has influenced human methods of thought from his day to the present time. Aristotle's successor, Theophrastus (c.372-287 B.C.), has left us two botanical works and a collection of thirty character sketches, as well as some fragments of philosophical and scientific works.

(4) The Alexandrian Age. With the decay of local political life in Greece and the gradual withdrawal of thoughtful men from public affairs, there came an enlargement of intellectual sympathy and a cosmopolitan attitude of mind unknown to the Greeks of the earlier period. The conquests of Alexander, which enormously enlarged the sway of Greek ideas and bound the world together as never before, contributed greatly to the new spirit which is characteristic of the Hellenistic period. Alexandria became the centre of this new world; and in that city was developed a literature, no longer spontaneous or creative, but derivative and erudite. Learned poetry was cultivated by Callimachus (c.310-c.240 B.C.), famous for his elegies, hymns, and epigrams, some of which we still have; Aratus (born c.270 B.C.), author of an extant astronomical epic; Lycophron (c. 270 B.C.), whose obscure poem *Alexandra* has survived; Apollonius Rhodius (c.295-c.215 B.C), whose artificial epic, *Argonautica*, is the best work of its kind that this period has left us; and finally Nicander (c.150 B.C.), who composed medicinal and other didactic works in epic form. The truest poet of the age was Theocritus (c.310-c.245), whose pastoral idyls are unsurpassed in any literature. Bion, a contemporary of Theocritus, and Moschus (c.140 B.C.), wrote also in the pastoral manner. Three of Theocritus's poems are mimes, dramatic pictures of common life, such as were first developed by Sophron in the fifth century. This class of literature was cultivated with great success by Herondas (c.250 B.C.). Closet tragedy, parody, and satire also flourished at this time.

Prose literature was scientific. The librarians Zenodotus, Aristophanes, and Aristarchus established literary scholarship and grammatical

study on scientific bases; Euclid created a system of geometry; and Eratosthenes founded astronomical geography and scientific chronology. In the third century B.C. Manetho and Berosus wrote chronological histories of Egypt and Chaldæa respectively.

(5) THE GRÆCO-ROMAN PERIOD (B.C. 146-A.D. 529). After the conquest of Greece by Rome in B.C. 146, Rome gradually took over her intellectual as well as political life, although she did not become a great centre of the world until the Imperial period. Polybius (c.205-c.120 B.C.), the chief Greek historian after Herodotus and Thucydides, belongs to the transition period. His history, in forty books, records the course of Roman conquest from B.C. 264 to the fall of Carthage (B.C. 146). It has reached us in a mutilated form, but is the most important source of our knowledge of the period. About B.C. 40 Diodorus Siculus wrote a history of the world down to Cæsar's Gallic Wars, in forty books, of which we have complete only books 1-5 and 11-20. Dionysius of Halicarnassus, in Augustus's reign, composed an early history of Rome, designed as an introduction to Polybius; of this there is extant only the first ten books, reaching to B.C. 450, and some fragments. His rhetorical writings exhibit considerable critical ability. Other historians are Josephus (born A.D. 37), whose two works on the Jews are of great value; Plutarch (c.46-c.120 A.D.), author of the famous *Parallel Lives* and *Morals;* Arrian (A.D. 95-175); Appian (flour. A.D. 150); Dio Cassius (c.150-c.235 A.D.); and Herodian (flour. A.D. 230). The *Lives of the Philosophers*, by Diogenes Laërtius (third century A.D.), and Philostratus's *Lives of the Sophists*, are valuable historical sources. Geography is represented by Strabo (c. 64 B.C.-19 A.D.). The work of Pausanias the Periegite (c.160 A.D.) is of the greatest value for a knowledge of Greek topography and works of art. In the same century Ptolemy developed his system of geography and astronomy, and Galen composed his medical treatises. At the close of this second century Athenæus wrote his *Deipnosophistæ*, a miscellany on every possible subject, cast in the form of a dialogue, which is valuable for the varied information it contains, drawn from sources now lost to us. Systematic rhetoric is represented by Hermogenes (second century) and Longinus (third century), and the new oratory of the later Sophists by Dio Chrysostom (first century), Ælius Aristides (second century), and by Themistius, Himerius, and Libanius (fourth century). The writings of the Greek fathers of the Church cannot be touched on here. (See PATRISTIC THEOLOGY.) Romance was cultivated by Xenophon, Longus, Heliodorus, Achilles Tatius, and Chariton. The most important literary philosophers were the Stoics, Epictetus and Marcus Aurelius; the Neo-Platonists, Plotinus, Porphyry, Iamblichus, and Hypatia, and the Athenian Proclus. The poets of the period are Babrius, Oppian, Nonnus, and Quintus Smyrnæus. Finally must be mentioned Lucian of Samosata, the great satirist and stylist of the second century, who most resembles Aristophanes in his wit and humor.

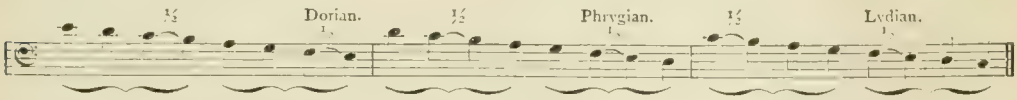
(6) THE BYZANTINE PERIOD, TO THE FALL OF CONSTANTINOPLE (1453). The latest of the writers mentioned in the preceding section might be counted in this period. For more than a thousand years after the removal of the capital from Rome, Constantinople was the metropolis of an empire whose language was Greek, and from which a vast literature has been preserved, much of which is of value. No adequate account can be given in the brief space here allowed; only the most important fields can be named. In history no genius appeared; but a long line of historians and chroniclers, from Agathias, in the sixth century, to Georgius Phrantzes and Laonicus Chalcondyles, in the fifteenth, have preserved to us the record of the great Byzantine Empire. Rhetoric was best represented by Johannes Doxopater, Alexis Comnenus (Byzantine Emperor, eleventh century), Georgius of Cyprus, Nicephorus Chumnus, and Theodorus of Hyrtace (thirteenth century), and Demetrius Cydones (fourteenth century). Philosophy was not a favorite pursuit; but Michael Psellus (1018-c.1100) deserves mention for the enormous range of his intellectual activities. The most famous of theologians was Johannes Damascenus (eighth century), while in the polemical strife of the fourteenth century Nicephorus Gregoras, Gregorius Palamas, Johannes Cantacuzenus, and Cyparissiotes took the leading parts. Naturally the study of the ancient authors occupied the learned in this period, and many commentaries have come down to us; in most cases, unfortunately, these are hardly more than stupid dilutions and expansions of ancient commentaries still extant. The best known of the Byzantine scholiasts are: Tzetzes (twelfth century); Eustathius (twelfth century), famous for his great commentary on Homer; Moschopulus (thirteenth century), who wrote on Homer, Pindar, the tragedians, and Theocritus; Thomas Magister (thirteenth-fourteenth centuries), commentator on the tragedians and others; Johannes Pediasimus, whose scholia on Hesiod have a slight value; and Triclinius (fourteenth century), whose writings include commentaries on Hesiod, Pindar, and the tragedians. The lexical work of the time is represented chiefly by Photius, Suidas, and the several *Etymologica*. In poetry the great anthologies were collected, but little of original value was accomplished. Profane verse was cultivated by Theodorus Prodromus (twelfth century) and by Manuel Philes (thirteenth-fourteenth centuries), but the best poetic composition appears in Christian hymns. See ROMAIC LITERATURE.

BIBLIOGRAPHY. For the classical period, consult the histories of Greek literature in English, by Müller and Donaldson, Mahaffy, Jevons, and Fowler; in French, by Croiset; and in German, by Bergk, Bernhardy, Sittl, and Christ. For the Alexandrine age, consult: Susemihl, *Geschichte der griechischen Litteratur in der Alexandrinerzeit* (Leipzig, 1891); Couat, *La poésie alexandrine* (Paris, 1882); for the Byzantine period, Krumbacher, *Geschichte der byzantinischen Litteratur* (Munich, 1897).

GREEK MUSIC. The development of music among the Greeks was never carried to that degree of perfection which characterized the other arts. Polyphony was unknown to them, and consequently their elaborate theoretical system had reference only to melody. How extensively their theories were carried out in practice we have little chance to judge, for our knowledge of Greek music is derived almost entirely from the writings of the theorists. The mathematical and technical details are very involved, and are still the subject of discussion among scholars. The most noticeable general characteristics are,

on the one hand, the limited compass, imperfect tonality, the thin, weak quality of their principal instrument (the lyre), and, on the other hand, perfect unison of musical form and language, a keen sense of difference in pitch, and splendid, delicate rhythms. But, as has been said, they had no conception of chords, and at its best their music must have been colorless.

Their system was the opposite of that used in modern music, for instead of taking the *major ascending* scale as a foundation, they used the *minor descending* scale, which was based, not on an octave and its repetition, but on a fourth and its repetition. Originally there were three scales —Dorian, Phrygian, and Lydian—named after the countries in which they sprang up. It would seem that at first these scales consisted of seven tones; but from the earliest times of which we have record they had eight tones, named from the strings of the lyre. The names of these tones were: Nêtê (lowest, this corresponded to our highest), paranêtê (next to nêtê), tritê (third), paramesê (next to mesê), mesê (middle), lichanos (forefinger string), parhypatê (next to the top), hypatê (topmost). The scale as thus formed was composed of two tetrachords, *disjoined* by a 'diazeutic tone' (so called because it cut the scale in two). The three original scales were approximately as follows:



The diazeutic tone intervals were respectively b—a, a—g, g—f. To these scales were added the Hypo-Dorian, Hypo-Phrygian, and Hypo-Lydian, each a fifth *below* its original, and still later three more, the Hyper-Dorian, Hyper-Phrygian, and Hyper-Lydian, each of the latter being a fifth *above* its original scale. These additional scales were composed of *conjoined* tetrachords, the so-called 'diazeutic tone' following the other notes in the case of the 'hypo' scales, and preceding them in the case of the 'hyper' scales. The number of scales was ultimately increased to fifteen; but the above-mentioned nine were the important ones, and from them was developed the *Perfect System*, which became the basis of mediæval music. See DIAZEUTIC TONE; GAMUT; PLAIN CHANT; MODES.

How the Perfect System became a standard we cannot tell; it probably grew slowly, as the compass of the various instruments increased. It comprised two octaves, a^1—A. The foundation was the Dorian scale, and to this were added two conjoined tetrachords, one at either end of the scale. This arrangement gave a compass of two octaves, lacking one note, and to complete the full octaves an extra note (called *Proslambano-menos*, the acquired tone) was suffixed. Baker gives the following arrangement of the Perfect System:

It will be seen that, as in the original Dorian scale, the two middle tetrachords were disjoined. For modulations to the key of the lower quint, "the semi-tone above the highest note of the middle tetrachord was used; and hence was formed a special conjunct tetrachord (d^1—c^1—$\flat b^{\flat 1}$—a), in apposition to the disjunct one" (Riemann). The names of the tones in the Perfect System were derived from those of the original octave. The mesê was the tonic of this system, and was regarded as the central and most important note.

But though the Perfect System contained all the essential elements, there were certain defects to be remedied. Chief of these was the incompleteness of their chromatic degrees. As we have seen, their scales contained certain semi-tones; but to get a complete set of sharps and flats, they had recourse to *transposing scales*. The difference of their scales lay in the position of the semi-tone; so if, for example, we substitute in the original Phrygian scale a conjoined tetrachord in place of a disjoined one, and by so doing change the position of the semi-tone, we will have changed the scale to the Hypo-Dorian form. But although the position of the semi-tone is the same in both scales, the compass of this transposed Phrygian scale differs from the compass of the Hypo-Dorian. To all purposes, then, we have a new scale whose compass is Phrygian and whose form is Hypo-Dorian. This is called the transposed Phrygian scale. By this system of transposed scales the Greeks finally acquired a complete series of sharps and flats.

The musical *notation* of the Greeks was very complicated. They used a double set of characters, one for the singer and one for the player. At first there were fifteen characters (corresponding to the notes of the diatonic scale), taken from the letters of the old Ionic alphabet. Other notes were made by changing slightly or inverting these original characters. The musical instruments were few and simple. The lyre (q.v.), the cithara (q.v.), and the magadis, or harp, with from 20 to 40 strings, were the most important stringed instruments; while the aulos, a flute, and the syrinx, a shepherd's pipe, were the sole wind instruments. Our examples of ancient Greek music are few. The oldest is a papyrus fragment of six lines of a chorus in the *Orestes* of Euripides. The fragment was written in the time of Augustus, but the music is much earlier. Two hymns to Apollo, composed in the second century B.C., were found at Delphi in 1893, engraved on the marble walls of the Treasury of the Athenians. These have been specially studied by Reinach, Weil, and Crusius. Another inscription from Asia Minor has preserved a short song with the musical notation. The other remnants are three hymns, two of which were composed in the time of Hadrian, and a few specimens of instrumental music. It is of passing interest to note that in 1899 a concert of ancient Greek music was given in Bremen. Consult: Gevaert,

La musique de l'antiquité (Ghent, 1875), the standard work on ancient music; *La Melopee* (Ghent, 1895-96); Monro, *The Modes of Ancient Greek Music* (Oxford, 1894); and for technical treatises, Johnson, *Musical Pitch and the Measurement of Intervals Among the Ancient Greeks* (Baltimore, 1896), and Ambros, *Geschichte der Musik*, vol. i. (Leipzig, 1888). For the remains of Greek music and the theoretical treatises, see K. von Jan, *Musici Scriptores* (Leipzig, 1895-99); Reinach and Weil in the *Bulletin de Correspondance Hellénique*, xvii., xviii. (Paris, 1894-95); O. Crusius, *Die Delphischen Hymnen* (Göttingen, 1894). See also Gleditsch in Müller's *Handbuch der klassischen Altertumswissenschaft*, ii. 3 (3d ed., Munich, 1901).

GREEK PHILOSOPHY. The philosophy of the Greeks, which is the source of the Western philosophy of modern times, as Homer is the source of Western poetry, had its origin, not in Greece itself, but in the colonies of Asia Minor and Magna Græcia. The earliest or pre-Socratic period may be broadly divided into the Ionic and Italic schools. Both attempted to determine the nature, origin, laws, and destiny of the visible world. The earliest definite name is the founder of the Ionic school, Thales of Miletus, who began the transition from the mythological to the scientific interpretation of nature, and the search for an original substance or subject of reality. He was followed by Anaximander, who found this substance not in water but in indeterminate matter, while a third teacher of Miletus, Anaximenes, preferred the definite substance of air. A little younger was the greatest of the pre-Socratic philosophers, Heraclitus. He held one substance, changing itself into all the elements known to us, but chose to name it rather from its highest potency, fire, which exhibits most clearly the constant movement and activity of the world.

Next comes Pythagoras of Samos, who settled at Crotona in Italy, about 529 B.C., and there founded what is known as the Italic school. In contrast to the Ionic school, which believed in one ever-changing, self-developed universe—what Ritter has called dynamical physicism—the Italic transcendental physicists found their key to the universe not in any known substance, but in number and proportion. After the school of Pythagoras came a second Italian school, the Eleatic, founded by Xenophanes of Colophon, who migrated to Elea in B.C. 540. Its chief representative is Parmenides; his philosophy is the direct antithesis to that of Heraclitus in assuming that all that exists has existed and will exist the same forever, and that it is change and multiplicity alone which are illusory—an early idea of the indestructibility of matter.

The Ionico-Italic school represented mechanical physicism. Empedocles of Agrigentum and Anaxagoras, the teacher of Pericles and Euripides, agreed in accepting the Eleatic principle of the immutability of substance, while denying its absolute oneness. Democritus of Abdera was the chief exponent of the atomic theory, which based the universe on combinations of indivisible, unchangeable atoms. He closes the series of the pre-Socratic dogmatists, who devoted themselves to the investigation of nature as a whole. Between them and Socrates, the great regenerator of philosophy, comes the sceptical and sophistic era. The earliest of the Sophists are Protagoras of Abdera and Gorgias of Leontini; Hippias of Eleas and Prodicus of Ceos were somewhat younger. The effect of their teaching was the disintegration of established beliefs.

Socrates, while sharing the general scepticism as to natural philosophy, maintained the certainty of moral distinctions and laid down a method for the discovery of error and the establishment of truth. Among those influenced by him were certain imperfect or one-sided Socraticists. Antisthenes, founder of the Cynic and indirectly of the Stoic schools, was the caricature of the ascetic and unconventional side of Socrates. Aristippus of Cyrene, founder of the Cyrenaic school, also dwelt exclusively on the practical side of his master's teaching, holding that it was impossible to attain objective knowledge. In Hegesias the Cyrenaic doctrine finally blends with the Cynic.

The two most famous disciples of Socrates were Plato and Aristotle. While in some ways they looked at life and being from distinct points of view, giving the foundation for the famous saying that "every man is born either a Platonist or an Aristotelian," they have manifold relations. Plato's rich contributions to logic, psychology, metaphysics, ethics, and natural religion required codification. Aristotle, with perhaps the greatest gifts for analytic systematization of philosophy that have ever been seen, unconsciously applied himself to the task. Thus he developed Plato's dialectic method into the strict science of logic; Plato's 'ideas,' though shorn of their separate supra-mundane existence, survived in the Aristotelian 'form' as opposed to 'matter.'

With the death of Aristotle a new age begins. The fearless genius which had soared to the contemplation of supreme ideas of good, of the form and end and cause of all existence, sank back to earth. As the great pre-Socratic movement terminated in the scepticism of the Sophists, so this greater movement found its natural reaction in the scepticism of Pyrrho and the later Academy. The post-Aristotelian school were predominantly ethical, sensationalist, and materialist, as contrasted with the idealistic metaphysics of the preceding age. Of these schools the least original and the least important is the Peripatetic. The first name among the Sceptics is Pyrrho of Elis. (See KNOWLEDGE, THEORY OF.) The later development of the Academy may be divided into three schools—the old, the middle or Sceptic, and the reformed or Eclectic Academy. To the first belong the names of Speusippus, Xenocrates, and Polemo, who modified the Platonic doctrine mainly by the admixture of Pythagorean elements. The chief exponents of the middle Academy were Arcesilaus, Carneades of Cyrene, and his disciple, Clitomachus of Carthage, who neglected the positive doctrine of Plato and employed themselves mainly in a negative polemic against the dogmatism of the Stoics. The reformed Academy began with Philo of Larissa, the pupil of Clitomachus and teacher of Cicero.

But the two most important developments of the post-Aristotelian philosophy were Stoicism and Epicureanism. As Greek life came in contact with other races and the law of the State and the old religion of Greece were shaken, the need was felt of finding a substitute for these, a principle of conduct which should enable a man to stand alone and rise superior to circumstances. Such a principle the Stoics claimed to have found. Their

great names are Zeno, the founder, Cleanthes of Assos, and Chrysippus of Soli, called the second founder; in Panætius of Rhodes and Posidonius of Apamea, Stoicism showed a softened and eclectic tendency.

The broad distinction noticed above between the Italic or Doric and the Ionic schools reappears in the marked contrast between the two later materialistic schools. The Stoics are Doric and Roman in character, the Epicureans are Ionic and Greek. "The one might be said to represent the law, the other the gospel of paganism." Epicureanism may be briefly described as a combination of the physics of Democritus with the ethics of Aristippus; its end was even more exclusively practical than that of the Stoics. After Epicurus himself the most distinguished members of the school were Metrodorus, Hermarchus, Colotes, and Leonteus.

But beneath the antagonism of the post-Aristotelian schools there was much in common, and a constant tendency, especially in the Academic and Stoic schools, to approximate to each other. The rise of the Roman power and the growing intercourse between Greece and Rome furthered a natural movement, on the one side toward Scepticism and on the other toward Eclecticism, as it was surmised that different schools presented different aspects of truth. A consideration of the latter (see ECLECTICISM), which is typified in Cicero, would carry us outside the limits of purely Greek philosophy, as would the later hybrid between the ideas of the East and the West, known as Neo-Platonism (q.v.). For a popular yet scholarly account of the whole history, consult Mayor, *Sketch of Ancient Philosophy from Thales to Cicero* (Cambridge, 1881); also Bender, *Mythologie und Metaphysik* (Stuttgart, 1899); Erdmann, *History of Philosophy*, vol. i. (Eng. trans., London, 1890); Brandis, *Geschichte der Entwickelungen der griechischen Philosophie* (Berlin, 1862-64); and see the articles on the various schools and philosophers mentioned above.

GREEK POLITICAL PARTIES. See POLITICAL PARTIES, paragraph on *Greece*.

GREEK RELIGION. As considered in this article, a term to express the relations in which the Greek stood to his gods. Such relations are, of course, conditioned by the beliefs held at various times as to the nature, power, and attributes of these gods, and these beliefs in turn are expressed in forms of worship, in literature, and in life. In the developed civilization of Greece, this religion is a complex organism made up of various elements which the complete absence of a system of theology has left unharmonized, so that few conceptions are sharply and consistently defined, while many of the details are hopelessly blurred. In spite, however, of this lack of precision, there is a certain unity in these religious views, and, as presented in literature and art, the Greek polytheism has proved a powerful factor in the development of modern civilization. So far, indeed, as the literature is concerned, it must be admitted that it presents to us rather the mythology than the religion of the Greeks; that is to say, it gives less prominence to the belief in the gods as divinities than to the stories about them, in which the strictly religious element usually occupies but a small place. The nature and growth of myth is treated in the article on MYTHOLOGY, and the chief myths relating to the gods and heroes are to be found in the separate articles devoted to them.

The Greek was a deeply religious person. He had a strong sense of his weakness, as compared with the powers of nature by which he was surrounded, and gladly owned his dependence upon the divine beings by which he believed those powers were controlled. The perception of the uncertainty of human fortune and its apparently arbitrary course undoubtedly led to fear of the might which could produce such sudden alternations of prosperity and adversity; yet it would be a mistake to regard this as the determining principle in the attitude of the Greeks toward their gods. In general, the relations between gods and men were friendly, and the wrath of the gods was directed against those who overstepped the limits assigned to human activities, and by overweening pride, reckless ambition, or even immoderate prosperity, excited the divine envy, and brought Nemesis upon themselves. The words of Herodotus, "The god suffers none but himself to be proud," are the concise expression of a thought which is to be found throughout the whole range of Greek literature. While, therefore, fear was not prominent, there was a very distinct sense of human limitation; and the gods, as the single source of all that came to men, were approached with offerings and prayers either to win their favor for the future or in thanksgiving for the past. In front of every door stood the conical stone of Apollo Agyieus, and often a terminal figure of Hermes; in the court was the altar of Zeus Herkeios; at the hearth Hestia was worshiped; while kitchen, storerooms, and bedchamber had their appropriate divinities. From birth to death there were few events in the life of a Greek when the gods were not remembered. And if this is true of the individual, much more is it true of the State. On the favor of the gods depended its existence; consequently their festivals were celebrated with devout regularity under the care of high officials, while rich offerings marked the public thankfulness for unexpected deliverance or unusual prosperity. Thus the Athenian victories over the Persians were commemorated by the erection of the colossal bronze Athena on the Acropolis and a group of statues at Delphi, while the zenith of the Athenian Empire saw the erection of the Parthenon and Propylæa on the Acropolis, as well as new temples at Eleusis, Rhamnus, and Sunium. The limits of this article prevent a more detailed statement, but any careful study of Greek private life and public institutions will show how closely religion was connected with both. Yet, in spite of this, sacerdotalism is almost unknown. At the seats of the Mysteries or the oracles, such as Eleusis or Delphi, the priests were of course powerful, but in general they were merely official representatives of the community, chosen like other officials, or sometimes allowed to purchase their position. Even where the office was hereditary or confined to a certain family, it was not regarded as conferring on its possessor any peculiar knowledge as to the will of the gods, or special power to constrain them. The need of an intermediary between the worshiper and the god was not felt, nor was the exact performance of a complicated ritual required. It is sometimes said that the religion of the Greeks was inde-

pendent of morality, and it must be admitted that many of the stories of the gods present them in a most unfavorable light. It may also be granted that the morality of the Greeks was not derived from their religion; but whatever the source of the ideas, they were early brought under the protection of the gods, who were deemed the special guardians of the unwritten laws by which human conduct was to be guided. The literature shows plainly that the effect of this was to lead the loftier minds to a higher conception of the gods themselves, and to a rejection of the earlier legends which attributed to them acts offensive to a more developed moral sense. At the same time the absence of any belief in a revelation intrusted to a chosen few prevented the formation of any canonical system, and thus it is that, while the general attitude toward the gods remained much the same, there was a great diversity in many details. It is, therefore, very difficult to formulate briefly the Greek religious belief, as statements that are true for one time or place or social condition may be quite misleading if applied to another. The following characteristics may, however, be fairly said to belong to that religion during the greater part of the independent national life.

To the Greek, then, the gods were everywhere, all nature being full of divine life. They were innumerable, and naturally they differed much in rank. In later times we find a distinction between the gods (*θεοί*), and the daimones (*δαίμονες*), inferior spirits, usually malevolent, though the name is also applied to a host of lesser powers occupying a place between the greater gods and men, and including the heroes and spirits of the dead. These gods have full control over the world and the forces of nature, but the world is not their creation; they are immortal, but they have a beginning. The various cosmogonies and legends of successive dynasties of gods are scarcely parts of the religious system, still less are they reminiscences of the supplanting of earlier religions by the cult of Zeus and his kindred. The gods were generally considered to have the form of men, though possibly of somewhat greater size. The huge dimensions assigned to Ares in the *Iliad* are quite exceptional. Though regarded as possessing unlimited powers of transformation, they are quite removed from the monstrous or grotesque. The Greek love of moderation is as influential in religion as in art or literature. In general, the gods were divided into those of the heaven, the earth, and the sea, though often the latter are omitted. The heavenly gods dwell in the sky, or on some lofty mountain, usually Mount Olympus in Thessaly. The earth or chthonic deities are conceived of as on or under the earth, and naturally often include the heroes and the dead. It should be noted that the line between these classes is very indefinite, and the same divinity is sometimes found in one and sometimes in the other. Space will permit only a brief outline of the grouping of the gods in the popular mythology. At the head was Zeus, 'father of gods and men,' and the supreme ruler of the universe, though bound in some mysterious way by the decrees of fate. His wife was Hera, queen of heaven, and the special guardian of the sanctity of marriage. Associated with them as the chief divinities of heaven were Hephæstus, god of fire and the patron of the workers in metal; Athena, the virgin daughter of Zeus; Apollo and his sister Artemis; Ares, the god of war; Aphrodite, goddess of love; Hermes, the divine messenger; and Hestia, guardian of the hearth. Around these greater gods are grouped a host of lesser deities, some of whom enjoyed high honor in certain localities. Such are Helios, the sun, Selene, the moon, and other heavenly bodies; the attendants on the Olympians, as the Horæ or seasons, the Charites or Graces, the Muses, Iris, Hebe, and Ganymede. The sea was ruled by Poseidon, the brother of Zeus, and second in power to him alone. With him was often worshiped his wife Amphitrite, while about them were grouped the Nereids, Tritons, and other less important sea-gods. The chief chthonic divinities were Hades, the ruler of the lower world, and his wife, Persephone, the daughter of Demeter. Demeter herself was usually reckoned among the Olympians, but her sphere of activity was more closely connected with the earth, as the giver of grain and the knowledge of agriculture to men. On earth also belonged Dionysus, god of wine, with his bands of Mænads, Satyrs, and Sileni, though he, too, is frequently found with his father, Zeus, in heaven. Gæa, the earth-mother, plays a larger part in legend than in cult, but Asclepius, the god of healing, Pan, the great god of the Arcadian herdsmen, and some others, seem to have been more frequently objects of worship than of narrative. Characteristic of the Greek religion is the specialized conception of each god, who is, on the whole, limited to a specific, though often wide, field of activity. Henotheism, so prominent in the Vedas, by which the special object of worship seems for the time being to possess all the powers of all the deities, is scarcely found in Greece, and it may well be doubted whether there is any real approach to monotheism outside of some of the philosophical schools. The general conception of divinity does not lead to a conception of one Divine Being. If we turn from the literature to the evidence afforded by inscriptions, or such works as the guide-book of Pausanias, it is at once clear that there were an immense number of local cults, sometimes attached to the names of the great gods, but more often connected with the name of some local hero, who was doubtless often an old divinity fallen from his high estate. Certainly the country population was far removed from any thought of one god.

It is a striking fact that at its first appearance in literature the Greek religious system had already received its definitive form. Some new divinities were introduced later, but the Homeric poems show us the hierarchy of the gods in substantially the organization which it retained till it was extinguished by the new faith. The origin of this religion was a mystery to the Greeks themselves, though they speculated not a little on the subject, and in a somewhat crude form anticipated many later theories. Herodotus thought that many of the names of the gods had been learned from the Egyptians; Prodicus, the sophist, seems to have taught that the gods were mere personifications of the objects that brought blessings to men, such as the sun, air, light, agriculture, etc.; while Euhemerus gave elaborate expression to ideas long prevalent when he interpreted the myths as distorted history and the gods as idealized men of the past. It is not possible in this article to give a detailed survey of the many theories of Greek religion which have

been advanced, only to be discredited. Two views were long prominent. One saw in the Greek religion only a corruption of an original revelation, and much ingenuity was displayed in tracing biblical teachings in the Hellenic myths. The other bore some relation to this in that it assumed that the Greek mythology and the popular beliefs were but the symbolic forms in which the priests clothed the most profound truths which were too deep for the popular mind. The great exponent of this theory was Fr. Creuzer (*Symbolik und Mythologie der alten Völker*, 2d ed., Darmstadt, 1820-24; Fr. ed., enlarged by Guigniant, Paris, 1825-51), but it exercised a powerful influence during the first half of the nineteenth century, especially in the explanation of the Greek vases and other works of art. With the growth of the science of comparative philology and a clearer recognition of the connection between the Indo-European peoples, a flood of light was thrown on the names of many of the Greek gods; and as etymological identity with Vedic and sometimes northern deities seemed obvious in many cases, it was naturally believed that here at last was the key to unlock the past. Many of the Vedic deities are clearly personifications of the powers of nature, and this is doubtless true of some of the Greek gods, but the attempt to resolve the Greek religion into a pure nature-worship has been unsuccessful. One difficulty is that original identity of name does not mean later identity in the conception of the deity to whom the name is attached. Dyaus and Zeus may be the same word, but the former is only a shadow in the Vedic mythology, while the latter is the greatest of the gods. Explanation has also been sought, with very good results, through the researches of anthropology into the primitive ideas of savage tribes and the survivals of primitive customs and superstitions among more civilized races. These studies have led to the theory which finds in *animism*, or worship of spirits, usually malevolent, the kernel of all religion, and traces its development by a strict process of evolution. This undoubtedly explains much in Greek religious rites and conceptions, but it cannot be regarded as completely satisfactory. It seems as though the solution, if it can ever be reached, must be sought by a combination of these various lines. The names of the gods must be studied by the aid of comparative philology that the original conception embodied therein may be brought to light. Local cults, ritual usages, and superstitions must be collected and compared with similar rites among kindred or primitive peoples, and the history and development of the several myths examined. It is necessary, also, to consider the problem of foreign influence and contamination by the union of originally diverse conceptions under a common name. At one time the tendency was to explain everything as an importation; and in the reaction against this extravagance K. O. Müller and his followers doubtless went too far in their claim that all was autochthonous unless there is historical proof of foreign origin. Lately, the tendency has been to admit a larger share of foreign influence, though it must not be forgotten that the Greeks assimilated and transformed whatever they derived from their intercourse with other nations.

In conclusion, it may be well to call attention to certain phases of Greek religion, preserving apparently primitive elements which were forced into the background by the more highly developed cults. Prominent among these are the traces of fetishism in the numerous cases of sacred stones, which are sometimes called images of definite gods, as the pyramidal Zeus at Phlius, or the rough stones called Charites at the Bœotian Orchomenus, but are sometimes unnamed, like the Omphalos at Delphi. The worship of trees has in most cases been transformed into the consecration of the tree to some god, as the olive to Athena, and the laurel to Apollo. (Compare Bötticher, *Baumkultus der Hellenen*, 1856; Frazer, *The Golden Bough*, 2d ed., London, 1900.) The numerous cases of animals sacred to a god seem also to contain reminiscences of an animal worship, of which there are, perhaps, indications in the Mycenæan Age, but the proofs of primitive totemism in Greece are as yet very scanty. The worship of the souls of the dead, or, at any rate, their propitiation by offerings, was a large part of Greek religion, though it was less prominent than the more public rites. Greek ideas about the soul and the other world were indefinite, but it was certainly the popular belief that the soul survived the body, and either hovered about the tomb or departed to a shadowy region, where it led a melancholy existence in need of the offerings brought by surviving relatives. It was evidently believed to have power to inflict injury, and it is also certain that proper funeral rites for the body were needed to insure its peace. In some cases the State paid divine honors to a departed soul, usually as a 'Heros' (ἥρως), as the Athenians honored Sophocles. This worship is, of course, important from the point of view of the animistic theories. It is fully discussed by E. Rohde, in *Psyche* (2d ed., Freiburg, 1898).

BIBLIOGRAPHY. The number of works is enormous, but most of those published before 1850 are antiquated, and many later works can be safely neglected. The following works treat the general subject with detail: Preller, *Griechische Mythologie* (Leipzig, 1854; 4th ed., vol. i. by Robert, Berlin, 1887-94). The second volume, containing the Heroes, is still unpublished. This is probably the best single work. Gerhard, *Griechische Mythologie* (Berlin, 1854-55), still useful for the material therein collected; Welcker, *Griechische Götterlehre* (Bonn, 1857-63), a work which was the culmination of a life of study covering the whole poetry and art of the Greeks, as the source for a correct understanding of their religious beliefs; Decharme, *Mythologie de la Grèce antique* (2d ed., Paris, 1886), of value from its references to the treatment of mythology in art. There is no thoroughly good work in English. The lectures of Max Müller and the works of Andrew Lang discuss some phases of Greek religion. The former is the coryphæus of the 'comparative mythologists,' while the latter writes from the anthropological point of view. Gruppe, in *Griechische Kulte und Mythen*, vol. i. (1887), and in his "Griechische Mythologie," in Müller, *Handbuch der klassischen Alterthumswissenschaft* (Munich, 1897, 1902), has revived the prominence of foreign influence, and collected much information on the religions of the neighboring peoples. The material is collected most completely in Roscher, *Lexikon der griechischen und römischen Mythologie* (Leipzig, 1884 et seq.), and the mythological articles in Pauly-Wissowa,

Realencyklopädie der klassischen Alterthumswissenschaft (Stuttgart, 1894 et seq.), are also of high merit. A narrower field is covered by such works as Nägelsbach, *Homerische Theologie* (2d ed., Nuremberg, 1861), and *Nachhomerische Theologie* (Nuremberg, 1857); Wide, *Lakonische Kulte* (Leipzig, 1893); and Farnell, *Cults of the Greek States* (London, 1896). The questions of primitive religious rites are treated by Mannhardt, *Wald- und Feld-Kulte* (Berlin, 1875-77), and Frazer, *The Golden Bough* (New York, 1890), mentioned above. Of great importance, as treating the subject from a new standpoint, is Usener, *Götternamen* (Bonn, 1896), which is reviewed by Gildersleeve, in *American Journal of Philology*, xxvii. (Baltimore, 1896). The representations of the gods in art are collected in the unfinished work of Overbeck, *Griechische Kunstmythologie* (Leipzig, 1873-89), with a large folio atlas of plates. See GREEK FESTIVALS; MYSTERIES; and, for the treatment of a special phase of Greek religious life, ORACLES.

GREEK SLAVE, THE. A well-known statue by Hiram Powers (1843). One of the six duplicate copies of it in marble is in the Corcoran Gallery at Washington.

GREEK VERSION. See BIBLE.

GREELEY. A city and the county-seat of Weld County, Colo., 52 miles north-northeast of Denver, on the Cache la Poudre River, and on the Union Pacific and the Colorado and Southern railroads (Map: Colorado, E 1). It is the seat of a State normal school, and has a public library, and Lincoln and Island Grove parks. The city is the centre of a fertile irrigated belt, and makes extensive shipments of potatoes, sheep and cattle, flour, wheat, etc. There are several lumber-yards, a flour-mill and elevator, a beet-sugar factory, etc. Settled in 1870, Greeley was incorporated in the following year. The government is administered under a revised charter of 1886 which provides for a mayor, elected biennially, and a city council. The water-works are owned and operated by the municipality. Population, in 1890, 2395; in 1900, 3023. The 'Greeley Colony,' named after Horace Greeley, was mainly composed of New England people. They were the first agricultural (irrigation) community in Colorado. Imbued with idealistic principles, they encountered with remarkable success, though not without many hardships and reverses, all the pioneer problems of the desert.

GREELEY, HORACE (1811-72). An eminent American journalist, born in Amherst, N. H., February 3, 1811, of Scotch-Irish ancestry. His father, Zaccheus Greeley, was a farmer whose unfertile acres kept him poor. Horace's early education was limited. In 1826 he entered the office of the *Northern Spectator* at East Poultney, Vt., and in 1830 he started out for himself as a journeyman printer, working at Jamestown and Lodi, N. Y., and then at Erie, Pa. In August, 1831, he went to New York City, where, after doing journeyman work in several offices, he founded, January 1, 1833, with Francis V. Story and H. D. Shepard, the *Morning Post* (said to have been the first two-cent daily ever published), which failed within three weeks, and which was succeeded in March, 1834, by the *New Yorker*, confessedly the best literary paper in America at that time. Greeley also about this time contributed leading articles to the *Daily Whig*. In 1838-39 he also edited the *Jeffersonian*, a political weekly published at Albany, and in 1840 edited and published the *Log Cabin*, a weekly, in the interest of Harrison as a Presidential candidate. These ventures prepared the way for the *Daily Tribune*, of which Greeley was at first sole proprietor and publisher, as well as chief editor, and the first number of which appeared April 10, 1841, followed in the autumn by the *Weekly Tribune*, into which the *New Yorker* and *Log Cabin* had been merged. The *Weekly* ultimately circulated widely throughout the Northern and Western States, and came to wield an influence unprecedented in the history of American journalism, Greeley thus becoming a recognized power in national as well as State politics.

In December, 1848, Greeley entered Congress, to fill a vacancy, and served until March 4, 1849. He was quick to discern and point out the evils and abuses of existing institutions, but he was neither a revolutionist nor an iconoclast. Though not in the strict sense of the word an abolitionist, he was an opponent of slavery, and foremost among those who sought to resist its extension to the territory acquired from Mexico. From 1850 to the end of the conflict, the *Tribune*, under his direction, did much to strengthen the anti-slavery sentiment of the Northern people, and to prepare them for the great struggle that ensued. In this Greeley was ably assisted by an unusual corps of editorial workers, including Bayard Taylor, Charles A. Dana, James S. Pike, and George Ripley. In addition to its championship of the anti-slavery cause, the *Tribune* became prominent through its advocacy of protection, and the extraordinary hold of the weekly edition upon the farming class was due in no small measure to the attention which the interests of agriculture received in its columns. It is said, by men who shared Greeley's confidence, that though he was too proud to be an applicant for any office, or to take any step to secure a nomination, he yet felt very keenly the neglect of others to recognize his honorable claims for promotion upon the parties he served so faithfully and well. He was a delegate from Oregon to the Republican National Convention at Chicago in 1860, his own State refusing to send him, and was influential in bringing about the nomination of Lincoln in preference to Seward. When, after Lincoln's election, the South threatened to secede from the Union, he declared that if a majority of the people of any State, after full and free discussion, should sincerely and deliberately vote to leave the Union, he was willing that they should withdraw. He held, however, that the votes actually taken at the South did not express the real convictions of the majority, but were the result of terrorism and panic; and when the Civil War broke out, he lent his voice and influence to the support of the Government in its efforts to suppress the Rebellion by force. He had a keen sense of the horrors of a civil war, and was willing to adopt any reasonable and rational plan to avert them. The war once begun, he was in favor of its vigorous prosecution, and impatient with what seemed to him unreasonable slowness on the part of the Government. At times he was much discouraged, and disposed to think that, to avoid worse calamities, the war should be ended by some compromise short of the result most to be desired. It was this feeling

that made him willing to go to Canada in 1864, with the unofficial sanction of Lincoln, to hold a conference, which proved fruitless, with George N. Sanders, Jacob Thompson, and Beverly Tucker, the Confederate agents, on the subject of peace. At the close of the war he advocated the doctrine of universal amnesty and universal suffrage. He held that the prolonged imprisonment of Jefferson Davis, without indictment or trial, was a palpable infraction of the Sixth Amendment of the Constitution, and he therefore joined with Gerrit Smith and others in signing the bail-bond of the late head of the Confederacy. This action, in the existing state of public sentiment at the North, brought upon him much odium. In 1861 he was a candidate for the Republican nomination for United States Senator, but was defeated by Ira Harris. In 1864 he served as a Presidential elector, and in 1869 was the unsuccessful Republican candidate for Comptroller of the State of New York. In 1870 he was a candidate for Congress in the Sixth New York District, but was defeated, the district being overwhelmingly Democratic. He nevertheless ran 300 votes ahead of the Republican State ticket. In 1872 he was opposed to the renomination of General Grant for a second term, and coöperated with a body of Liberal Republicans who held a convention in Cincinnati, on May 1st, in advance of the regular Republican convention, to nominate another candidate. On the sixth ballot the nomination fell to Mr. Greeley, and was accepted by him. Much doubt has been expressed with regard to the wisdom of Mr. Greeley in allowing himself under the circumstances to be made a candidate for President upon the platform adopted by this party (see LIBERAL REPUBLICAN PARTY); but he himself considered that he thereby merely reaffirmed the principles for which he had contended as a Republican, and that he neither made nor proposed any concession whatever to those who had opposed and resisted these principles. When the Democratic Party adopted that platform in its entirety and without qualification, and nominated him as their candidate for President, he recognized the political unwisdom of their action, but accepted it as the sign and pledge of a new departure, and believed that if he should be elected there would be an end of all political schemes having their root in the spirit of slavery, and calculated to array the South against the North. A man of sensitive spirit and of great pride, he was deeply wounded, disappointed, and mortified on finding himself accused by many of his old friends of having thrown away his principles, and of having entered into a conspiracy to turn over the government of the country to the control of the men who had instigated the Civil War. The popular vote cast for him amounted to 2,834,079, against 3,597,070 for General Grant; but the only States carried by him were Georgia, Kentucky, Maryland, Missouri, Tennessee, and Texas. He had overtasked his powers for many years. Near the close of the campaign he was called upon to watch at the bedside of his dying wife. During the whole contest his powers of endurance were strained to the utmost, and when it was at last over, he was prostrated by a disorder of the brain, and, sinking rapidly, died on November 29, 1872. He published: *Hints Toward Reforms* (1850); *Glances at Europe* (1851); *History of the Struggle for Slavery Extension or Restriction in the United States* (1856); *Overland Journey to San Francisco* (1860); *The American Conflict* (2 vols., 1864-66); *Recollections of a Busy Life* (1868); *Essays Designed to Elucidate the Science of Political Economy* (1869); and *What I Know of Farming* (1871). Consult: The biographies of Greeley by Parton (New York, 1855; later edition, Boston, 1872); by Reavis (New York, 1872); by Ingersoll (Chicago, 1873); and by Zabriskie (New York, 1890). Consult also *A Memorial of Horace Greeley* (New York, 1873).

GREE'LY, ADOLPHUS WASHINGTON (1844—). An American Arctic explorer and meteorologist. He was born in Newburyport, Mass., where he received a high-school education. In July, 1861, he enlisted as a private in the Nineteenth Massachusetts Volunteer Infantry, in which he served throughout the war, being thrice wounded and receiving the brevet of major on being mustered out in 1865. In 1867 he was appointed a second lieutenant in the Regular Army. In the following year he was detailed for duty in the Signal Corps. In 1876-79 he directed the construction of over two thousand miles of military telegraph in Dakota, Colorado, Montana, Wyoming, and Texas. In 1881 he was appointed to command the Government expedition planned in pursuance of the recommendations of the International Geographical Congress at Hamburg, in 1879, that thirteen circumpolar stations be established in the Arctic regions. The destination of the expedition, which included twenty-five men and was provisioned for three years, was Lady Franklin Bay on the northeast coast of Grinnell Land. The party wintered two years at Discovery Harbor, Grinnell Land, whence expeditions were sent both into the interior of Grinnell Land, and across the straits into Greenland, one of the exploring parties under Lockwood and Brainard reaching, in May, 1882, latitude 83° 24′, the farthest north attained up to that time. After making geographical discoveries of great value and recording extensive meteorological observations the party set out to return southward in August, 1883. Reaching Cape Sabine with great difficulty, they spent there the winter of 1883, during which all save seven perished from cold and starvation. Meanwhile, in the summers of 1882 and 1883, efforts had been made to communicate by ship with the party, but both had failed. The survivors were rescued at Cape Sabine by a relief expedition under Commander W. S. Schley, in June, 1884. For his services to geographical science, Lieutenant Greely was awarded the Founder's Medal of the Royal Geographical Society, and the Roquette Medal by the Société de Géographie, Paris, and was promoted to the rank of captain in the United States Army. In 1887 he was appointed by President Cleveland to succeed Gen. W. B. Hazen as chief signal officer, with the rank of brigadier-general. His publications include: *Three Years of Arctic Service* (2 vols., 1885); *American Weather* (1890); *American Explorers and Travellers* (1894); *Handbook of Arctic Discoveries* (1896); and numerous reports of much value, among which are: *Chronological List of Auroras* (1881); *Diurnal Fluctuations of Barometric Pressure* (1891); *Proceedings of the Lady Franklin Bay Expedition* (1888); *Rainfall of Western States and Territories* (1888); and *Climatology of Arid Regions* (1891). He also edited *Public Documents of the First Fourteen Congresses, 1789-1817* (1900). Consult, in addi-

tion to *Three Years of Arctic Service* (New York, 1886), Schley, *The Rescue of Greely* (New York, 1885).

GREEN (AS. *grēne*, OHG. *gruoni*, Ger. *grün;* connected with AS. *growan*, OHG. *gruoan*, to grow). The color which is found on the spectrum between the blue and the yellow, and is known as the color of grass and other vegetable substances, as well as that of the minerals chrysocolla and malachite. It may be made artificially by mixing varying proportions of blue and yellow pigments. Among the more important green pigments which are of mineral origin are the following: *Arsenical green* or *Scheele's green*, a precipitate obtained from a solution of copper sulphate when treated with a mixture of arsenious oxide and potassium carbonate dissolved in hot water; *Brunswick green*, a mixture of lead chromate and Prussian blue; *chrome green*, either the green chromium sesquioxide, or a mixture of chrome yellow and Prussian blue; *copper green*, frequently the same as *Mountain green*, or any artificially prepared green copper salt, as copper carbonate; *Emerald green*, *Imperial green*, *Mitis green*, or *Schweinfurth green*, made by boiling concentrated solutions of arsenious oxide in copper acetate; *Gellert's green*, a mixture of cobalt blue and zinc oxide; *Guignet's green*, a mixture of chrome yellow and Prussian blue; *Mountain green*, any native earthy green mineral, such as chrysocolla, glauconite, or malachite; *Prussian green* or *Hooker's green*, a mixture of gamboge and Prussian blue. The green vegetable dyestuffs have been superseded by artificial coal-tar derivatives. See COAL-TAR COLORS, and DYEING.

GREEN, ANDREW HASWELL (1820-1903). An American lawyer, financier, and philanthropist, born in Worcester, Mass., and educated at the Worcester Academy. He studied law and practiced in New York City, acting as executor of the Tilden, Ogden, and other large estates. In 1856 he was president of the New York City Board of Education; was president of the Central Park Board from 1857 to 1870, and comptroller from 1871 to 1876. He managed the city's finances in the face of enormous deficits made by the peculations of the Tweed ring, and reëstablished its credit. In 1868 he proposed the plan for a 'Greater New York,' afterwards initiated in 1897, and he also originated the plan of forming the New York Public Library out of the Astor, Tilden, and Lenox foundations. He founded the New York Zoölogical Society, assisted in the establishment of the Metropolitan Museum of Art and the Museum of Natural History, and gave great aid to many charitable institutions in New York City.

GREEN, ANNA KATHARINE. See ROHLFS, ANNA KATHARINE.

GREEN, ASHBEL (1762-1848). An American Presbyterian clergyman and educator, the son of Jacob Green. He was born at Hanover, N. J.; served in the Revolution; graduated at Princeton in 1784, and afterwards became professor of mathematics and of natural philosophy there. He was then for some time a Presbyterian pastor in Philadelphia, and in 1792 was Chaplain of Congress. From 1812 to 1822 he was president of the College of New Jersey (now Princeton University), at the same time being president of the Board of Trustees of Princeton Theological Seminary. Beginning in 1822, he edited the Philadelphia *Christian Advocate* for twelve years. Among his works are: *Presbyterian Missions* (1820), and a *Discourse Delivered in the College of New Jersey, with a History of the College* (1822). Consult Jones, *Life of Ashbel Green* (New York, 1849).

GREEN, BARTHOLOMEW (1666-1732). An American printer and publisher, born at Cambridge, Mass. He succeeded to his father's printing business in 1690, and established himself first in Cambridge and then in Boston. On April 24, 1704, the *Boston News Letter*, the first, and for many years the only, newspaper in the British colonies, appeared from his press, published for John Campbell, postmaster. Afterwards it became Green's property, and became widely known for the independence and originality of its political and religious utterances. Green was distinguished for his piety and benevolence.

GREEN, BERIAH (1794-1874). An American reformer, a native of New York State. He was educated at Middlebury College, Vermont, and studied for the ministry, but his religious beliefs did not agree with any denominational creed. In 1821 he was made professor of sacred literature in the Western Reserve College, though his violent opposition to slavery caused him to leave that institution after a few months. Afterwards he was for many years president of the Oneida Institute in Ohio. He exerted a great influence in anti-slavery circles, served as president of the National Anti-Slavery Convention which assembled in Philadelphia in 1834, and was one of Garrison's warmest friends. His writings include a *History of the Quakers* (1823), and *Sermons and Discourses, with a few Essays and Addresses* (1833).

GREEN, DUFF (1791-1875). An American politician and journalist, born in Woodford County, Ky. He was educated in the country schools, and was himself engaged in teaching on the outbreak of the War of 1812, in which he served in the Kentucky militia. After the war he removed to Missouri, where he again taught school, and studied law at the same time. He took an active part in the movement that led to the admission of Missouri as a State, was a member of the convention that drew up the State Constitution, and after its admission was, in 1823, elected to the State Senate. In the same year he became editor and proprietor of the *Saint Louis Enquirer*, and two years later removed to Washington, D. C., where he purchased the *United States Telegraph*. After the accession of President Jackson in 1829, the *Telegraph* supplanted Gale's *National Intelligencer* as the Administration organ, and enjoyed Government patronage that is said to have amounted to $50,000 a year. Green himself became one of the confidential advisers of the President, and was a member of his famous 'Kitchen Cabinet.' After the open break between Calhoun and Jackson, the *Telegraph* was bitter in its attacks on the latter and Van Buren, as a result of which the Government printing was taken away from it, and given to the *Globe*, which had been established as the Jackson organ, with Francis P. Blair as its editor. Green continued in control of the *Telegraph* until 1835, making it the most bitter and violent exponent of the nullificationists. From 1835 to 1838 he edited a paper, in the same interest, known as the *Reformation*, after which he

spent some years in Europe engaged in various business enterprises. In 1844 he returned to the United States and established a short-lived newspaper, the *Republic*, in New York City. He was twice sent on special diplomatic missions to Mexico. In his later years he was active in the industrial development of the South, was largely interested in railroads in Georgia, and was one of the founders of the town of Dalton, in that State, where he died. Considerable information concerning him may be found in Benton, *Thirty Years' View*.

GREEN, George (1793-1841). An English mathematician, born at Sneinton. He was educated at Cambridge, and devoted himself largely to original research in mathematics, as the fruit of which he read the following papers before the Cambridge Philosophical Society: *Essay on the Application of Mathematical Analysis to the Theories of Electricity and Magnetism* (1828), in which, for the first time, he uses the now well-known scientific term 'potential'; *On the Reflection and Refraction of Light at the Common Surface of Two Non-Crystallized Media* (1837); *On the Reflection and Refraction of Sound* (1837); and *On the Propagation of Light in Crystalline Media* (1839). Although he held no university position and died at the early age of forty-seven, he contributed greatly to the progress of the science of mathematics, of which he was one of the foremost representatives of his day in England.

GREEN, Jacob (1722-96). An American patriot, born at Malden, Mass. He graduated at Harvard in 1744, entered the Presbyterian ministry in 1745, and became pastor of a church of that denomination at Morristown, N. J. In 1757 he was elected to the presidency of the College of New Jersey (now Princeton University). In 1775 he was sent as a delegate to the New Jersey Provincial Congress, and was chairman of the committee appointed to draught a State Constitution. A series of articles by him on the question of the depreciation of paper money was widely read at the time, and his plan therein suggested for the redemption of the Continental currency was similar to that later followed by Congress. He further published two volumes of *Sermons* (1768, 1769), and other works.

GREEN, John Richard (1837-83). An English historian. His education, except some two or three years of private instruction, was received in his native city, Oxford, at Magdalen College School, and at Jesus College, where he graduated in 1859. His interests were historical rather than scholastic. Religious, and raised in Tory and High Church principles, he took orders in 1860, and for the next five years lived in East London. In 1866 he became Vicar of Saint Stephen's, Stepney. His health failing, and his inclination to a clerical life abating, he resigned in 1869 to become librarian at Lambeth, devoting himself henceforth to history and politics. His first important historical work, *A Short History of the English People*, was the outcome of his desire to leave behind him some of his accumulations of knowledge in a form easily available to ordinary people. He rewrote it twice, and was only persuaded to publish it in 1874. Its object, as the title suggests, was to give the story of social development of the conditions which affected the lives of the great mass of the people, in preference to mere dynastic or military chronicles. While it is not infallible in detail, its great merit is the attractive vividness with which it presents one picture after another of the past. It had a great and immediate success, and was ultimately expanded, still keeping the same point of view, into the four-volume *History of the English People* (1877-80), in which he received much assistance from his wife, Alice, daughter of Archdeacon Stopford, whom he married in 1877. A visit to Egypt in 1881 aggravated his lung trouble, and made labor very difficult for the rest of his life. His courage, however, enabled him to persist in the writing of another work of a less popular and more scholarly nature, *The Making of England* (1882), which came down to the consolidation of the kingdoms under Egbert. The materials for the subsequent volume, *The Conquest of England*, down to the coming of the Normans, were so far put together that his widow was enabled to publish it in the year of his death, 1883. His *Stray Studies in England and Italy* (1876) was a collection of essays marked by notable historical insight. In spite of his ill health, the brilliancy of his conversation and the breadth of his sympathy gave him a marked influence, especially among the historical students of his generation.

GREEN, Joseph (1706-80). A humorous verse-writer of the Revolutionary period in America, born in Boston and educated at Harvard. He was banished for his loyalist sympathies, but he returned to the popular side, and his pen spared neither party in such works as *The Wonderful Lament of Old Mr. Tenor* (1744), and *Poems and Satires* (1780).

GREEN, Mary Anne Everett (1818-95). A minor English historian, who wrote under her maiden name, Wood. She was born at Sheffield. Educated at home and in the British Museum, she was an industrious compiler, editor, and biographer, conscientious in original research; wrote for the reviews; and made exhaustive calendars of State papers. In 1845 Miss Wood married an artist, George Pycock Green, in London, but continued her work in the Public Record Office for forty years. Her *Lives of the Princesses of England* was published in six volumes (1849-55). She edited the letters and diaries of many distinguished persons, and was herself highly esteemed as a linguist, antiquary, and philanthropist.

GREEN, Seth (1817-88). An American pisciculturist. He was born in Rochester, N. Y. Beginning at twenty years of age, he devoted his life to the artificial propagation of fish and the breeding of the better kinds for stocking lakes and streams. After many experiments he succeeded in hatching enormous numbers from the spawn of shad, trout, and other species, with which he stocked the Connecticut, the Hudson, the Potomac, the Susquehanna, and many other streams. He also introduced shad into Pacific coast waters. He was for many years superintendent of fisheries of New York. He received several medals from France, and other honors, and was the author of *Trout Culture* (1870), and *Fish Hatching and Fish Catching* (1879).

GREEN, Thomas Hill (1836-82). An English philosopher, born in Birkin, Yorkshire. He was educated at Rugby and Oxford, was elected fellow of Balliol College in 1860, tutor there in

1866, and Whyte professor of moral philosophy in 1878. A disciple of Wordsworth, Kant, and Hegel, he turned his critical powers upon their opponents, the empiricists. He maintained that empiricism disintegrates all experience into isolated sensations, and fails to explain how such sensations can constitute a knowledge of an ordered objective world. This knowledge, he maintained, presupposes the existence of a timeless intelligence as the essential principle of all cognitive beings. This eternal principle, as it appears in finite beings, is a 'reproduction' of the one timeless omniscience which is the indispensable condition of the existence of the world of nature. And not only human knowledge, but also human volition, points to this eternal spirit, for a timeless principle is necessary to change a natural animal want into such motives as determine the will. So influential has Green's teaching been that there has grown up a body of thinkers, first at Oxford, then elsewhere, who are united in maintaining Green's fundamental doctrine of the eternal consciousness as the postulate of experience. These thinkers form what is sometimes called the Neo-Hegelian School. Edward Caird, F. H. Bradley, B. Bosanquet, John Watson, D. G. Ritchie, A. Seth, Pringle-Pattison, John Dewey, and very many other English and American philosophers have been profoundly influenced by Green's views, however far they may be from subscribing to them. He is supposed to be the original of "Mr. Grey" in Mrs. Ward's *Robert Elsmere*. Green's works include an *Introduction to Hume's Treatise of Human Nature* (1874); *Prolegomena to Ethics* (1883); and lectures on various subjects, posthumously published under the editorial supervision of Nettleship (1885-88). Consult the biographical sketch contained in vol. iii. of these collected works; also Fairbrother, *The Philosophy of T. H. Green* (London, 1896); A. Seth, *Hegelianism and Personality* (Edinburgh, 1887); Ritchie, "The Political Philosophy of T. H. Green," in *The Principles of State Interference* (London, 1891); Sidgwick, "Green's Ethics," in *Mind*, ix. (ib., 1884); Upton, "The Theological Aspects of the Philosophy of T. H. Green," in *The New World*, i. (Boston, 1892).

GREEN, VALENTINE (1739-1813). An English engraver, born at Salford in Oxfordshire. He studied under Robert Hancock at Worcester, and then went to London in 1765, where he devoted his attention to engraving in mezzotint. His large plates after West's "The Return of Regulus to Carthage," and "Hannibal Swearing Eternal Enmity to the Romans," attracted much attention. In 1775 he was appointed mezzotint engraver to the King, and afterwards obtained the privilege of engraving the pictures in the Düsseldorf Gallery. The siege of that city by the French twenty years later put a stop to this work, but he had already executed twenty-two plates. A descriptive catalogue of these was published in 1793. His four hundred or more plates include many after Reynolds, Romney, Gainsborough, and Italian and Dutch artists. He was also an author. His son RUPERT (c.1768-1804), an engraver, assisted him in much of his work.

GREEN, WILLIAM HENRY (1825-1900). An American Presbyterian theologian. He was born in Groveville, N. J., graduated at Lafayette College in 1840, and in 1846 at Princeton Theological Seminary, where he was appointed instructor in Hebrew. From 1849 to 1851 he was pastor of the Central Presbyterian Church of Philadelphia. He then became professor of biblical and Oriental literature in Princeton Seminary. He was the official head of the seminary, and in 1868 declined the presidency of Princeton College. He was the most distinguished scholar in this country among those who hold the traditional orthodox view of inspiration, and was chairman of the American Old Testament Revision Company. He published *A Grammar of the Hebrew Language* (1861); *The Pentateuch Vindicated from the Aspersions of Bishop Colenso* (1863); *A Hebrew Chrestomathy* (1865); *The Argument of the Book of Job Unfolded* (1874); *Moses and the Prophets* (1883); *Hebrew Feasts* (1885); *The Higher Criticism of the Pentateuch* (1895); *The Unity of the Book of Genesis* (1895); and *A General Introduction to the Old Testament* (2 vols., 1898-99).

GREEN'AWAY, KATE (1846-1901). An English artist, born in London. She received her first instruction from her father, John Greenaway, a well-known wood-engraver and designer. Afterwards she went to Heatherley's Art School and studied at South Kensington and in the London Slade School. Her first work was exhibited at the Dudley Gallery in 1868. She continued to exhibit for many years, both at the Academy and the Water-Color Society, and her designs and illustrations became very popular on the Continent and in America, as well as in England. In her special field, the delineation of child life, her only rivals are Randolph Caldecott, Walter Crane, and Boutet de Monvel. Her drawings are distinctive for their individual charm and quaint humor. Her draughtsmanship and color are skillful and delicate, and her work possesses a grace and freshness that won immediate recognition. Of late years other influences have superseded hers, but she retains a unique place among English artists. Her best-known works are: *Kate Greenaway Little Folks' Painting Book* (1879), which had an enormous sale; *Kate Greenaway Birthday Book* (1880); *Mother Goose*, and *A Day in a Child's Life* (1881); *Language of Flowers* (1885); and the Christmas almanacs that appeared for a number of years. She also illustrated Jane and Ann Taylor's *Original Poems*, and other books for children.

GREENBACK PARTY. In American political history, a party organized to further the increased use of a 'greenback' currency, and a completer recognition of such currency as a legal tender. After the close of the Civil War the rise in the gold value of United States notes, or 'greenbacks' (see MONEY), occasioned much distress in the States of the Middle West, where business operations had become adjusted to the high scale of prices prevailing during the war. An act of 1866 which aimed gradually to retire the greenbacks awakened a great deal of opposition; and when it was proposed, in 1868, to make the bonds not specifying the medium of payment payable in coin, what was denominated the 'Ohio idea'—a demand that all such bonds should be paid in greenbacks—gained vogue, controlling the Democratic National Convention, although Seymour, who was opposed to it, received the Presidential nomination. The discussion of the Re-

sumption Bill in 1874 led to a revival of the greenback agitation. On November 24, 1874, a convention, national in scope, met at Indianapolis, and advanced three propositions: (1) That the note circulation of State and national banks should be prohibited; (2) that the only paper currency should be greenbacks, exchangeable on demand for bonds bearing interest at 3.63 per cent.; (3) that coin should be used to pay only the interest on the national debt and the principal of bonds expressly payable in coin. The supporters of these views were at first inclined to attach themselves to the Democratic Party; but when it became clear that Tilden would be the nominee of the party, they withdrew and formed the 'Independent Party,' more generally known as the Greenback Party. In 1876 they nominated for the Presidency Peter Cooper, of New York, who received 81,737 popular votes, chiefly from the Middle West. The labor troubles of 1877 led to the formation of numerous local workingmen's parties, which united with the Greenbackers and created the 'National' or Greenback-Labor Party in 1878. In the elections of the same year this party controlled a popular vote of more than a million, and elected fourteen Congressmen. In 1880 the party nominated for President James B. Weaver, of Iowa. He received a popular vote of 300,867, the number of Greenback-Labor Congressmen being reduced to eight. In 1884 Gen. B. F. Butler was nominated by the Greenbackers, as also by the Anti-Monopolists, and received 175,380 votes. After that year the party ceased to exercise independent influence, generally becoming merged with the Democrats in the North and the Republicans in the South.

GREENBACKS. A name popularly applied to the legal-tender notes issued by the United States Government during the Civil War and since. The printing upon the back of these notes has always been in green ink, which explains the origin of the term. For the history of these issues, see MONEY.

GREEN-BARKED ACACIA, â-kā′shâ *or* â-kā′shī-â. See PARKINSONIA.

GREEN BASS. A local name for the large-mouthed black bass. See BASS.

GREEN BAY. A large arm of Lake Michigan, extending from the northwestern part of the lake 120 miles southwest into Wisconsin (Map: Wisconsin, F 4). It is 10 to 20 miles wide, and its great depth (over 110 feet) gives the water a green color, whence its name. It receives the Fox River at the city of Green Bay.

GREEN BAY. A city, port of entry, and the county-seat of Brown County, Wis., 113 miles north of Milwaukee, at the head of Green Bay and at the mouth of Fox River, on the Chicago and Northwestern, the Chicago, Milwaukee and Saint Paul, the Green Bay and Western, and the Kewaunee, Green Bay and Western railroads (Map: Wisconsin, F 4). It has the Kellogg Library, occupying a fine new building (Carnegie), handsome municipal and Federal buildings, and Hagemeister Park and Race Track, while just beyond the city limits is the State Reformatory. There are six bridges, three each across Fox and East rivers. The capacious harbor admits the largest lake steamers, and the city carries on an extensive trade in lumber, fish, and grain. The manufactured products include canned goods, beer, paper, furniture, and wood-working machinery. The government is administered under a charter of 1882, revised in 1896, by an annually elected mayor and a unicameral council, which elects the school board, assessors, street superintendent and assistant, fire chief, and poor commissioner, and confirms the executive's appointments to the board of health, police board, and police officers. Population, in 1890, 9069; in 1900, 18,684.

Green Bay is built near the site of an ancient Indian village, which was visited by Nicollet in 1639, and at which, in 1669, Father Allouez established a Jesuit mission, where, by 1673, over 2000 Indians had been baptized. In 1680 a military station was established here by Tonty; but both mission and fort seem to have been deserted by 1730, and the first permanent settlement in Wisconsin was made here by Langlade in 1745. In 1761 the English took possession and built Fort Edward Augustus (abandoned in 1763); in 1796 they surrendered the place to the Americans, who, in 1816, built Fort Howard on the west side of Fox River, around which a settlement grew. The first newspaper in Wisconsin was published here in 1833. Green Bay was incorporated as a borough in 1838, and in 1854 was chartered as a city. Fort Howard was united with Green Bay in 1896. Consult: Durrie, *Green Bay for Two Hundred Years, 1639-1839* (Madison, Wis., 1872), and an article, "The Old Town of Green Bay," in *Magazine of American History*, vol. xxiii. (New York, 1889); *Historic Green Bay* (1895).

GREENBONE, or **GOREBILL.** Names in England for the gar (*Belone vulgaris*). See GAR.

GREENBRIER. See SMILAX.

GREEN′BRIER. A tributary of New River, an affluent of the Great Kanawha River, West Virginia (Map: West Virginia, D 3). It rises in the Shaver Mountains in Randolph County, and after a southwestern course through a picturesque valley between the main Alleghanies and the Green Brier Ridge, flows into New River at Hinton.

GREEN BRIER MOUNTAINS. A ridge west of and parallel with the main chain of the Alleghany Mountains, in West Virginia (Map: West Virginia, D 3). Greenbrier, the highest point of the ridge, is 3500 feet high. Near it is located Greenbrier White Sulphur Springs, one of the most frequented and fashionable of West Virginia spas.

GREEN′BUSH, N. Y. See RENSSELAER, N. Y.

GREEN′CASTLE. A city and the county-seat of Putnam County, Ind., 40 miles west of Indianapolis, on the Louisville, New Albany and Chicago, the Cleveland, Cincinnati, Chicago and Saint Louis, and the Vandalia Line railroads (Map: Indiana, C 3). It is the seat of the De Pauw University (q.v.), and has a public library. The most important manufactures include lumber, lightning-rods, and drag-saws. Greencastle was settled in 1822 and was incorporated in 1849. Under a charter revised in 1895, the government is administered by a mayor, elected every two years, and a municipal council. Population, in 1890, 4390; in 1900, 3661.

GREEN COVE SPRINGS. A town and the county-seat of Clay County, Fla., 30 miles south of Jacksonville, on the Saint Johns River, and

on the Jacksonville, Tampa and Key West Railroad (Map: Florida, G 2). It is a popular resort, noted for a warm sulphur spring which is frequented because of its medicinal properties. The town is engaged chiefly in growing fruits and vegetables, and lumbering, and has some manufactures. Population, in 1890, 1106; in 1900, 929.

GREENE, Albert Gorton (1802-68). An American minor poet, born in Providence, R. I. He graduated at Brown in 1820, was admitted to the bar in 1823, and from 1832 he held the clerkship of the town as well as that of the Municipal Court of Providence, of which he was chosen judge in 1858. After his health failed in 1867, he removed to Cleveland, where he died. He was actively interested in education, aided in founding the Providence Athenæum, and was president of the Rhode Island Historical Society. He began the important collection of American poetry now in the library of Brown University, and known as the Harris Collection. He was the author of several popular poems, especially "Old Grimes" and "The Baron's Last Banquet."

GREENE, Charles Ezra (1842—). An American civil engineer, born in Cambridge, Mass., and educated at Harvard University, and the Massachusetts Institute of Technology. He served as quartermaster during the last two years of the Civil War, and was United States assistant engineer from 1870 to 1871, when he was appointed to the chair of civil engineering at the University of Michigan. His publications include: *Graphical Method for the Analysis of Bridge Trusses* (1875); *Trusses and Arches: Graphics for Engineers, Architects, and Builders* (3 vols., 1876-79); *Notes on Rankine's Civil Engineering* (1891); and *Structural Mechanics* (1897).

GREENE, Charles Gordon (1804-86). An American journalist, born at Boscawen, N. H. After short engagements on the Taunton *Free Press*, the Boston *Spectator*, and on the Boston *Statesman*, he settled in Philadelphia in 1827, and started the *National Palladium*, in which the Presidential campaign of Andrew Jackson was vigorously advocated. In 1828 Greene was on the staff of the *United States Telegraph* in Washington, until after Jackson's election, when he returned to the Boston *Statesman*, of which he later became the proprietor. He founded the Boston *Post* in 1831; served in the Massachusetts Legislature; and was naval officer of Boston from 1853 to 1861.

GREENE, Charles Warren (1840—). An American journalist and author, born at Belchertown, Mass. He graduated at Brown University, and received his M.D. from Dartmouth College (1867). His writings include articles on natural science contributed to various encyclopedias; *Animals: Their Homes and Habits* (1886); and *Birds: Their Homes and Habits* (1886).

GREENE, Christopher (1737-81). An American soldier, born in Warwick, R. I. He served in the Colonial Legislature of Rhode Island from 1770 to 1772, and in 1775 became a lieutenant of the Kentish Guards, organized in Kent County. He was rapidly promoted, displayed great courage at Bunker Hill, and was captured during General Arnold's attack upon Quebec. He was made colonel in 1776, and in October of the same year was assigned to the command of Fort Mercer on the Delaware River, which he gallantly defended against a Hessian attack in 1777. Late in 1780 he was ordered south to aid Gen. Nathanael Greene, and in May, 1781, was killed at his post on the Croton River, Westchester County, N. Y.

GREENE, Edward Lee (1843—). An American botanist, born at Hopkinton, R. I. He was educated at Albion College, Wisconsin, studied for the ministry, and was an Episcopal clergyman from 1871 to 1885, when he became a Roman Catholic. From 1885 to 1895 he was associate professor of botany at the University of California, and thereafter held a similar position at the Catholic University in Washington, D. C. In 1893 he was president of the International Congress of Botanists, assembled in connection with the World's Columbian Exposition at Chicago. His publications comprise: *Illustrations of West American Oaks* (1889-96); *Flora Franciscana* (1891); and *Pittonia* (4 vols., 1887-90), besides many papers in botanical magazines.

GREENE, Francis Vinton (1850—). An American soldier and author; son of Gen. George Sears Greene, born in Providence, R. I. He graduated at West Point in 1870. After two years in the artillery service he was transferred to the United States corps of engineers (1872), and was assistant astronomer and surveyor on the Northwest boundary survey (1872-76). During the Russo-Turkish War he was military attaché to the United States Legation at Saint Petersburg, and after accompanying the Russian Army in the field from the Danube (July, 1877) to Constantinople (March, 1878), received from the Emperor the decorations of Saint Vladimir and Saint Anne for bravery at the battles of the Shipka Pass and Philippopolis. In 1886 he resigned from the army, but during the Spanish-American War he served in the Philippines, and received the commission of major-general after the capture of Manila. He retired again in 1899. In 1903 he became police commissioner of New York City. His publications include: A series of works on military campaigns, including *The Russian Army and Its Campaigns in Turkey* (2 vols., 1879) and *The Mississippi Campaigns of the Civil War* (1880); and *Life of Nathanael Greene* (1893).

GREENE, George Sears (1801-99). An American soldier and civil engineer; father of Gen. Francis V. Greene. He was born in Warwick, R. I., graduated at West Point in 1823, where for several years he was an instructor, and in 1836 resigned from the service to become a civil engineer. He was engaged in the construction and location of railroads in Maine, Massachusetts, Rhode Island, New York, and Maryland until 1857, when he entered the service of the Croton aqueduct department of New York City. He subsequently built the reservoir in Central Park, and the enlargement of High Bridge. In 1862 he reëntered the Union Army as colonel of the Sixtieth New York Volunteers, was made a brigadier-general soon afterwards, commanded his brigade at Cedar Mountain, and led a division at Antietam. At Gettysburg he was stationed on the right wing of the Federal army, and on the night of July 2, 1863, withstood an attack by a superior force of Confederates. In September of the same year (1863) he was transferred to the West, and on October 28th,

during an engagement near Chattanooga, received a wound which disabled him till January, 1865. He then joined General Sherman's army in North Carolina, and took part in the operations leading to General Johnston's surrender. In 1866 he retired from the army, and was chief engineer and commissioner of the Croton aqueduct department from 1867 until 1871, when he was appointed chief engineer of public works in Washington, D. C. General Greene designed the plan for the entire sewerage of that city (1871-73). From 1875 to 1877 he was president of the American Society of Civil Engineers.

GREENE, George Washington (1811-83). An American historian, grandson of General Nathanael Greene, born at East Greenwich, R. I. He was educated at Brown University, and subsequently spent several years in study and travel in Europe. From 1839 to 1845 he was United States Consul at Rome. He returned to America in 1848 to accept the chair of modern languages at Brown University, which he resigned in 1852 to devote his time to historical writing. In 1872 he became non-resident professor of American history at Cornell University. In addition to two text-books of botany, and a French grammar, he edited *The Works of Addison* (6 vols., 1853); and published a number of historical works, of which the most important are: *Historical Studies* (1850); *History and Geography of the Middle Ages* (1851); *Biographical Studies* (1860); *Historical View of the American Revolution* (1865); *Life of Nathanael Greene* (3 vols., 1867-71); *The German Element in the War of American Independence* (1876); and *Short History of Rhode Island* (1877).

GREENE, Nathanael (1742-86). An American soldier, prominent in the Revolutionary War. He was born August 7, 1742, at Patowomut, Warwick County, R. I. His father was a leading preacher among the Quakers, and educated his son very simply, training him from childhood to work on his farm, and at his anchor-forge and grist-mill. By his own perseverance, however, the son acquired considerable knowledge of ancient and English history, geometry, law, and moral and political science. In 1770 he was chosen a member of the Rhode Island Assembly, and, to the great scandal of his fellow Quakers, was among the first to engage in the military exercises preparatory to resisting the mother-country. On July 20, 1774, he married Catharine Littlefield of Block Island. In the same year he enlisted as a private in an independent company, the Kentish Guards, and in 1775 was appointed to the command of the Rhode Island contingent sent to the army at Boston, with the rank of brigadier-general. He was promoted to be major-general on August 9, 1776, and was placed in command of the troops on Long Island. In the affair of Harlem Heights, where he was for the first time under fire, he handled his command with skill and valor. The movements by which the British General, Howe, tried to turn the flanks of the American army forced Washington to withdraw the greater part of his forces into New Jersey, leaving Greene in command of the remainder near Fort Washington on the Hudson. As the obstruction to navigation had been removed by the British, Greene's position was much exposed, and he was authorized to fall back across the river. The matter was left to his discretion, however, and he deemed it inadvisable to retire at the time. Preparations were made to defend the fort, then commanded by Colonel Magaw, but it was invested by Howe's forces, and was compelled to surrender on November 16, 1776, after a spirited conflict. (See Fort Washington.) In the New Jersey campaign of 1776-77 Greene distinguished himself, particularly at Trenton and Princeton. At the Battle of Brandywine he commanded a division, and by his skillful movements saved the American army from utter destruction; at Germantown he commanded the left wing, and was vigorously pressing the enemy when a panic seized a brigade of militia, which gave way, and the American forces were compelled to retire, which they did in good order, General Greene commanding the rear-guard. In 1778 he reluctantly consented to act as quartermaster-general, and administered the office acceptably at a time when its administration was attended with great difficulties. His particularly noteworthy service was rendered after he succeeded General Gates on October 30, 1780, in the command of the Army of the South. Congress vested in him authority to raise supplies, appoint officers, and command all the troops raised or to be raised in six States. Gates had just been completely defeated by Cornwallis at the battle of Camden (August 16, 1780), and Greene, upon his arrival in North Carolina in December, 1780, found the army in a wretched state. By dint of great activity, he got his troops into better condition, and remained for a short time on the defensive. In the meantime the prospects of the Americans had been improved by the decisive victory at King's Mountain (October 7, 1780), and by Morgan's overthrow of Tarleton at Cowpens (January 17, 1781). Nevertheless, Cornwallis forced Greene northward into Virginia; but Greene, being reënforced, reëntered North Carolina, and took his stand at Guilford Court-house. Battle was joined here (March 15, 1781) and Greene was defeated, though he remained in control of much of North Carolina, while Cornwallis found it expedient to move northward into Virginia. Carrying the war into South Carolina, Greene was defeated by Cornwallis's successor, Rawdon, at Hobkirk's Hill (April 25, 1781); but he held his own in a severe battle at Eutaw Springs against Stuart (September 8, 1781) and secured finally the exclusion of the English forces from all of Georgia and the Carolinas, except three coast towns. Congress struck, and presented to him, a medal in honor of this battle, and the Carolinas and Georgia made him valuable grants of land. When peace was restored in 1783, Greene returned to Rhode Island, where he received numerous testimonials of the public admiration. In 1785 he retired with his family to his estate in Georgia, where he died of sun-stroke in 1786 (June 19th). As a soldier Greene was fitly described by his distinguished opponent Cornwallis as being "as dangerous as Washington, vigilant, enterprising, and full of resource." He also possessed many of the qualities of a statesman, was well balanced, full of tact, a master of the countless details involved in raising troops in a country not wholly patriotic or friendly to the cause, in impressing Congress with the needs of the army, and in harmonizing the conflicting policies of the new States. Consult: Francis V. Greene, *General Nathanael Greene* (New York, 1893), in the

"Great Commanders Series"; and G. W. Greene, *The Life of Nathanael Greene* (3 vols., New York, 1867-71).

GREENE, Nathaniel (1797-1877). An American journalist, brother of Charles Gordon Greene. He was born in Boscawen, N. H., became an apprentice in the office of the *New Hampshire Patriot* in 1809, and in 1812 edited the *Concord Gazette*. After conducting several other local papers he founded in 1821 the *Boston Statesman*, a prominent Democratic organ. He was for fifteen years postmaster of Boston, and published several translations from the Italian, German, and French.

GREENE, Robert (c.1560-92). An English poet and dramatist, born at Norwich. He was placed at Saint John's College, Cambridge, where he graduated B.A. in 1578. He then traveled in Spain and Italy. On his return he reëntered the university, and took the degree of M.A. at Clare Hall in 1583. He was also incorporated at Oxford in 1588. Soon after leaving Cambridge he proceeded to London, where he supported himself by his pen. He died of a debauch September 3, 1592. As a dramatist, Greene was one of the precursors of Shakespeare. Of his five plays, the best known is *The Famous History of Friar Bacon* (performed in 1592, and undoubtedly earlier). In this play a story of necromancy is fused with a tender idyl. The romance *Pandosto* (1588) contributed incidents to Shakespeare's *Winter's Tale*. *Menaphon* (1589), containing much beautiful verse, is one of the best of the Elizabethan romances. Greene wrote many pamphlets, of which *A Groatsworth of Wit Bought with a Million of Repentance* (published just after his death, 1592) was immensely popular for fifty years. It contains the first undoubted allusion to Shakespeare after he came to London. Though Greene's life was dissipated, his writings are singularly pure. Consult: *Complete Works*, edited by Grosart for the Huth Library (15 vols., London, 1881-86); and *Plays and Poems*, edited by Collins (New York, 1902).

GREENE, Samuel Dana (1840-84). An American naval officer, born in Cumberland, Md. In 1859 he graduated at the United States Naval Academy as a midshipman, and two years later became a lieutenant. During the battle between the *Monitor* and the *Merrimac*, March 9, 1862, he had charge of the *Monitor's* guns, and commanded the Union vessel after the disabling of Lieutenant Worden (q.v.). He served throughout the war on various vessels; was assistant professor of mathematics at the Naval Academy from 1866 to 1868, and of astronomy from 1871 to 1875; was promoted to be commander in 1872; and acted as assistant superintendent of the institution from 1878 to 1882.

GREENE, William Batchelder (1819-78). An American author son of Nathaniel Greene (1797-1877). He was born in Haverhill, Mass., studied at West Point, and served in the Florida War. He was connected with the Brook Farm movement; graduated at the Harvard Divinity School in 1845, and became a Unitarian clergyman. In the Civil War he was colonel, and then brigadier-general of volunteers, but resigned in 1862. Among his works are: *The Sovereignty of the People* (1863); *Transcendentalism* (1870); *Theory of the Calculus* (1870); *Socialistic, Communistic, Mutualistic, and Financial Fragments* (1875).

GREEN EARTH. A name frequently applied to the mineral glauconite (q.v.). The name is also applied to pulverulent varieties of the minerals chrysocolla and malachite, especially when they are used in their natural condition as pigments. Another name for these earths is *mountain green*.

GREEN EBONY. The wood of Jacaranda ovalifolia, a tree of the natural order Bignoniaceæ, which is exported in considerable quantity from South America. It yields olive-green, brown, and yellow colors in dyeing, but is also employed to some extent by turners and carpenters. The wood is hard, and of an olive-green color. The tree has showy, panicled flowers.

GREEN'FIELD. A city and the county-seat of Hancock County, Ind., 21 miles east of Indianapolis; on the Pittsburg, Cincinnati, Chicago and Saint Louis Railroad (Map: Indiana, D 3). It has a public library and a fine high-school building. The city is surrounded by a farming district, and manufactures window-glass, fruit-jars, bottles, paper, gas-engines, foundry products, and bricks. Greenfield, incorporated as a city in 1876, is governed under the original charter, which provides for a mayor, elected every four years, and a unicameral council. The city owns and operates its water-works and electric-light plant. Greenfield is the birthplace of James Whitcomb Riley. Population, in 1890, 3100; in 1900, 4489.

GREENFIELD. A town and the county-seat of Adair County, Iowa, 45 miles west by south of Des Moines; on the Chicago, Burlington and Quincy Railroad (Map: Iowa, C 3). It is the commercial centre for a fertile agricultural and stock-raising region. Population, in 1890, 1048; in 1900, 1300.

GREENFIELD. A town and the county-seat of Franklin County, Mass., 56 miles west of Fitchburg; on the Connecticut River, and at the junction of two divisions of the Boston and Maine Railroad (Map: Massachusetts, B 2). It includes North Parish and Factory villages; and is principally engaged in the manufacture of cutlery, machinists' tools, machinery, shoes, silverware, agricultural implements, woodenware, paper boxes, bricks, and children's carriages. The town has a Soldiers' Monument, the Franklin County Hospital, and two public libraries. The government is administered by annual town meetings. Greenfield was settled in 1686, but remained a part of Deerfield until 1753, when it was incorporated as a town. During Shays's Rebellion a body of insurrectionary troops was quartered here. Population, in 1890, 5252; in 1900, 7927. Consult Holland, *History of Western Massachusetts* (Springfield, 1855).

GREENFINCH, or **GREEN LINNET.** (1) A familiar European finch (*Ligurinus chloris*), common in Great Britain. It is of a prevailing green tint, mingled with gray and brown. Its song is not very sweet, but in confinement it readily imitates the songs of other birds, and in consequence is a favorite cage-bird. (2) In the Rio Grande Valley, the name 'greenfinch' is given to a totally different bird (*Embernagra rufovirgata*), allied to the chewink (q.v.). This

GREENHOUSE PLANTS

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1 FUCHSIA - (MONARCH)
2 PRIMULA - (CHINESE)
3 CALCEOLARIA
4 AURICULA : (GRAY-EDGED)
5 BEGONIA (PAUL BRUANT)
6 CYCLAMEN

bird, also called 'Texas sparrow,' is about 6½ inches long, olive green in color, with rufous markings on the head and yellow on the wing. See GROSBEAK.

GREENFISH. (1) A Southern name for the bluefish (q.v.). (2) The pollack (q.v.), called also 'green cod' and 'gray cod.'

GREEN FROG, or SPRING FROG. One of the most familiar and widespread of North American frogs (*Rana clamata*), occurring in all kinds of waters throughout the Eastern United States and Canada. The male is about three inches long, the female half an inch longer. In color it is brilliant green on the head and shoulders, above, passing into brownish olive posteriorly; below, white, the throat citron-yellow; sides and thighs blotched or barred. The ear-drum of the male is very large, one-fourth greater than the large eye; in the female it is smaller. This frog is aquatic, and does not gather in large companies. Its only notes are an occasional 'chug,' and a sharp cry, uttered as it leaps into the water. It can make very long leaps, and is a rapid and skillful swimmer.

GREEN'HALGE, FREDERICK THOMAS (1842-96). An American politician, born in Clitheroe, England. He was early brought to America by his parents, studied for about three years at Harvard, and in 1863 went to Newbern, N. C., where he entered the commissary department of the Federal Army, but soon afterwards contracted fever, and returned north. He studied law, and was admitted to the bar in 1865. After he had occupied a number of minor political offices, he was elected Mayor of Lowell in 1880, and again in 1881. In 1888 he was sent as a Republican to Congress, and from 1894 until his death was Governor of Massachusetts. Consult: Nesmith, *The Life and Works of Thomas Frederick Greenhalge* (Boston, 1897); and a sketch in Lodge, *A Fighting Frigate and Other Essays and Addresses* (New York, 1902).

GREENHAT, Sir HUMPHREY. The nom-de-plume adopted by Sir Ambrose Crowley in the seventy-third number of the *Tatler*.

GREENHEART, or BEBEERU (*Nectandra Rodiæ*). A valuable timber-tree of the natural order Lauraceæ, a native of Guiana, which also yields a medicinal bark. The timber is commonly called greenheart; the bark is better known as bebeeru (otherwise beebeery, bibiru, bibiri, etc., and sipiri or sipeira); and the alkaloid to which it chiefly owes its properties is called *beberine*. This alkaloid, the formula of which is $C_{36}H_{42}N_2O_6$, may be obtained from the bark in the form of brown scales that are sparingly soluble in water and in alcohol, and have a strong, bitter taste. But although its chemical formula is accepted, it is probably not a single compound, but a mixture. The tree grows chiefly in British Guiana, and in the greatest perfection on the low hills immediately behind the alluvial lands; it rises with an erect, slightly tapering trunk to a height of 40 or 50 feet without a branch, attaining a height of 80 or 90 feet in all and a diameter of 3, or even 4, feet. The leaves are thick, oblong-elliptical, and shining; the flowers, yellowish-white, in axillary clusters; the fruit, which is about the size of a small apple, contains a single seed, about as large as a walnut. The fruit is intensely bitter, but contains a form of starch used as food by the natives. The wood is extremely strong and hard, and is exported to be used chiefly by turners for the same purposes as lignum vitæ, like which it sinks in water. It is also remarkable for its durability, for being almost exempt from the attacks of the white ants on land and of the teredo in water, and for the high polish it will take. It is used in Guiana for ship-building, and for all the most important purposes for which timber is required. The bark is hard, heavy, and brittle, has a grayish-brown epidermis, and is of a bright cinnamon color within. It has a very bitter, somewhat astringent taste. Its tonic and febrifugal properties resemble those of cinchona bark, although less reliable as an anti-periodic. The bark, as well as its alkaloid, is seldom used in medicine. A second alkaloid, nectandrine, found in the bark, has somewhat similar properties. South America produces a number of species of Nectandra. *Nectandra puchury major* and *minor* yield the seeds called pitchurim beans, which are astringent, are regarded as febrifugal, and are prescribed in dysentery, diarrhœa, etc., and the oil of which is used as a substitute for chocolate.

GREENHOUSE. A generic name given to glass buildings in which exotic and other tender plants, or plants out of their season, are grown. It embraces such structures as forcing houses, conservatories, hothouses, stove houses, orchard houses, graperies, bark stove houses, warm houses, etc. In its original sense, a greenhouse was a place in which plants were kept alive or green, but not expected to grow, and in this sense it is similar in meaning to conservatory. According as the temperature is raised above this point the structure becomes a hothouse or forcing house. The roofs, and generally the sides and ends of such plant-houses, are made of glass supported by wooden or metal sash-bars or rafters. The glass, besides making the house light, prevents the escape of much of the heat derived from the sun. When heat from this source is not sufficient for the purpose of the house, artificial heat is supplied. In the simpler and smaller structures this is furnished by fermenting horse manure, tanbark, or other organic material. Stove houses, or dry stoves, formerly heated by flues which extended from end to end of the house, are used for growing the more tender plants. In recent times the better houses are heated by hot water or steam, conducted through iron pipes. Modern greenhouses are characterized by great simplicity of construction; the framework is usually of wood or iron and wood, and very light considering its strength, and the glass of large dimensions.

GREENHOUSE PLANTS. Plants commonly cultivated under glass for decorative purposes, either for their attractive foliage or their flowers or both. With few exceptions the species are natives of the tropics and the warmer parts of the temperate zone. There are many thousands of species raised in American and foreign conservatories, among the most popular being those figured upon the accompanying plate, and described under their respective titles.

GREEN'HOW, ROBERT (1800-54). An American physician and historian, born in Richmond, Va. He was educated at William and Mary College, and afterwards in New York. He lectured upon historical subjects, was an apt linguist, and

published a *History of Tripoli* (1835), but his chief work was a *History of Oregon and California* (1846).

GREEN ISLAND. A village in Albany County, N. Y., situated on an island in the Hudson River, connected by bridges with Troy and Watervliet (Map: New York: G 3). It has shops of the Delaware and Hudson Canal Company's Railroad, railroad signal works, and important manufactures of knit goods, iron, machinery, lumber, stoves, etc. The village owns and operates its electric-light plant. Population, in 1890, 4463; in 1900, 4770.

GREENLAND. The largest island in the world. Its area, not exactly determined, is about 512,000 square miles. The island is 1500 miles in length and, at its broadest part, 690 miles in width. In the extreme south it barely extends below the parallel of latitude 60° N.; the north coast has not been entirely outlined, but Peary discovered that the most northern point of the islands that front this coast of Greenland is in 83° 39′, the cairn he built there standing on the most northern known land. Forming the extreme eastern portion of the American Arctic area, Greenland extends north and south between the Arctic and the Atlantic oceans. On the east it fronts the Arctic Ocean, and on the west it is separated from the American Arctic archipelago by the broad areas of Davis Strait and Baffin Bay, and farther north by the narrow waterways of Smith Sound, Kane Basin, and Kennedy and Robeson Channels. The outlines of Greenland could not satisfactorily be indicated till the surveys (1892-1900) of Peary on the northeast and north coasts, and of Nathorst and others on the east coast, had been completed. The coasts still unknown (1903) include the southern part of Melville Bay and portions of the northeast coast as far south as Cape Bismarck; but these unvisited shore-lines are too short materially to change the shape and size of the island as it now appears on the maps.

All the coasts are bordered by hundreds of islands, most of them small, and are penetrated by deep and narrow fiords, many of them choked with glaciers descending to the sea from the inland ice. A large part of the west coast, particularly in the south, has a belt of low shore lands, free from permanent ice and snow, about 100 miles in width in the district of Holstenborg, and 60 miles wide in the district of Godthaab; elsewhere on the west coast the lowland is much narrower. The east shore has the same phenomena of deeply dissected coasts and a low shore belt, which, however, is only 6 to 20 miles in width. All the inhabitants live on these lowlands near the sea. On many parts of the coasts there is no lowland, but lofty mountains descend sheer to the sea. The characteristic features of Greenland are the deep fiords, the lofty mountains, grand and sombre, bordering the sea or separated from it by the low belt, and the great cap of the inland ice and its attendant phenomena of innumerable glaciers. The mountains terminate the Greenland plateau and the precipitous face they show to the sea is from 1500 to 3000 feet in height. Many mountains rise to 5000 or 8000 feet, and Petermann Peak on the east coast to 11,000 feet. The whole interior of the land, or more than three-fifths of the entire surface, is covered with an unbroken ice sheet, believed to be from 2000 feet to a mile in thickness, comparatively level, its monotony relieved only near its outer edges by mountains (nunataks) rising above the ice surface. It was once supposed that the ice cap might surround depressions of ice-free land, but the journeys of Peary, who crossed the ice cap four times, and of Nansen, who crossed it once, dispelled this idea. Dr. Drygalski, of Germany, who has made a careful investigation both of the inland ice and of the glaciers of the west coast mountain tracts, believes that the great ice cap had its origin in the mountains of the interior and coastal regions, descending from them at first in the form of separate glaciers which gradually coalesced and so filled the valleys and smothered height after height till the whole land disappeared. A constant outflow of ice takes place, the ice sheet moving from the interior where it is thickest to the marginal area where it is thinnest. It is believed that the land surface of the interior is covered with mountains, as on the coast, but they are buried under the ice cap. The highest point reached by Peary on the ice cap was more than 8000 feet above sea-level.

The glaciers move down the fiords to discharge at the sea-edge as icebergs. Many of them, however, never reach the sea, their rate of movement being so slow that the summer melting keeps their fronts miles inland. The glacial movement seaward varies greatly along different parts of the coasts. It has been observed chiefly in Southwest Greenland, where the rate of movement, as measured among a considerable number of glaciers, ranges from 2 feet an hour to 99 feet a day at the large glacier near Upernivik. The east coast glaciers are usually much smaller than those of the southwest coast, but Peary has observed in Inglefield Gulf, Northwest Greenland, glaciers that compare in volume with the mighty ice rivers of the southwest, which is the birthplace of most of the icebergs that cross the track of Atlantic steamers during the summer months.

The climate is very cold, the mean annual isotherm of freezing temperature crossing the island near its southern end. This fact does not prevent the prevalence of warmth suitable for vegetation during the long summer day, in the interior of the fiords and in sheltered places exposed to the sun, nearly or quite to the northern end of the island. Thus the summer temperature in favored localities often reaches an important height. The mean temperature of the three summer months at Julianehaab, in South Greenland, is 48° F.; at Upernivik, farther north, it is 38° F. The long, dark winters are bitterly cold, the average temperature in South Greenland ranging from —7° to —20° F., while in the north temperatures of —60° to —70° F. have been recorded. January is the coldest month in the southern part of Greenland, and February in the north. The differences between the summer temperatures of the north and south are less than those between the winter temperatures. The east coast has a somewhat higher temperature than the west coast. April and August bring the largest precipitation, and the climate of the northern part of the island is drier than that of the south.

From the rock exposures along the coastal belts, it is inferred that the most of Greenland is composed of Archæan formations, chiefly gneiss and other crystalline rocks. Along the middle parts of both the west and east coasts it is found

also that the surface is covered with a thick flow of basalt overlying Tertiary, and also some Cretaceous deposits. Fossil plants of the Tertiary epoch are found on Disco Island and the adjoining mainland. Coal—lignite—is mined on Disco Island. Although Greenland does not appear to be rich in valuable minerals, it is the only country yielding cryolite in commercial quantities, the mines being situated at Ivigtut on the southwest coast. Iron ore is found, and the largest known meteorites were brought by Peary from near Cape York to the American Museum of Natural History in New York City. Graphite is also found, but not in quantity nor quality suitable for commercial purposes.

Under the influence of the sun, or of the warm east wind, large tracts in the south coast lands and considerable areas in the north are clad in a mantle of mosses, grasses, shrubs, and flowering plants. Most of the shrubs are trailing plants, and few trees grow to a height of over five or six feet. The flora, which includes about four hundred flowering plants and some hundreds of lichens, greatly resembles that of Scandinavia. Numerous edible berries (juniper, alder-berries, and others) form a small part of the food resources of the southern natives; and the white agents of the Danish Government have garden patches in which turnips, cabbage, lettuce, and very small potatoes are grown, mainly, however, under glass. The currents bring to the southerly coasts considerable driftwood, which is used by the natives in making harpoon-shafts, etc.

The fauna resembles that of Iceland, Spitzbergen, Lapland, and Nova Zembla. Among the mammals the musk-ox (found only to the north of the permanent ice cap) is alone of American origin, the white bear, Arctic fox and hare, ermine, and lemming being European. Peary killed wolves, foxes, and hares at the most northern point of his travels on the edge of the Arctic Ocean. Flies, mosquitoes, beetles, butterflies, and mollusks abound everywhere along the coast, and in fact no part of the ice-free areas is devoid of animal life. Reindeer are much less numerous than formerly, because of excessive hunting. The little auk, eider-duck, and swan have also been greatly depleted. There are about one hundred and twenty-five varieties of birds, many of which swarm in enormous numbers on the precipitous mountain sides. The Eskimo dog is regarded as the best sledge animal in the world; and in the Southern Inspectorate the Danes have introduced a few of their domestic animals. The neighboring waters are rich in food for many varieties of sea animal life. Greenland waters were great hunting grounds for the right whale until it was practically exterminated. The seal is the largest food resource of the natives, the walrus being next in importance. Walrus ivory and hides are important articles of export.

Industries and Commerce. The industries of Greenland are principally confined to fishing and hunting, and are almost exclusively in the hands of the natives. The unfavorable climatic conditions make agriculture, except a little gardening, impossible, and some of the necessaries and all of the luxuries of life are imported from Denmark. The chief products of the Danish colony are seal and fish oils, skins, and cryolite. A Pennsylvania company has the exclusive privilege of mining and exporting cryolite to the Americas, most of the output going to Philadelphia, though a little is sent to Copenhagen. The product is from 6000 to 12,000 tons a year. The commerce is a Government monopoly, and is under the control of a separate department at Copenhagen. The prices paid to the natives for their products are below their market value, a circumstance which is somewhat mitigated by the fact that the Government sells the necessaries of life at cost prices. The trade is carried on chiefly by barter, and commodities are supplied by the Government stores, which are found in every settlement. The exports and imports amounted to 340,000 kroner ($91,800) and 831,000 kroner ($224,370) respectively in 1900.

Government. The area embraced in the Danish colony is 46,000 square miles on the southwest coast and one settlement on the east coast, the whole including less than one-tenth of the area of the island. The administration is in the hands of the Greenland Commission at Copenhagen. At the head of the commission is a director, who is appointed by the Crown at the suggestion of the Minister of Foreign Affairs, and in his turn appoints the two inspectors for the administration of the inspectorates of North and South Greenland into which Danish Greenland is divided. The inspectorates are divided into several settlements, which are administered by Danish agents appointed by the director of the commission, and have councils for the regulation of local affairs. The capital of North Greenland is Godhavn, the most important settlement of the colony, and that of South Greenland, Godthaab.

Population. The population of Danish Greenland, in 1890, numbered 10,516, including 225 Europeans, almost exclusively Danes. The native population has a large admixture of European blood. Christianity is nominally professed by all the population of Southwest Greenland, but many of the native customs and superstitions still exist. For further facts relating to these natives and the Eskimo of other parts of Greenland, see Eskimo. For the exploration of Greenland, see Polar Research.

History. Greenland is supposed to have been first seen by Northmen early in the tenth century. The Norseman, Erik the Red, voyaged along the coasts in 985, and gave the country its name. Soon thereafter a settlement was made under his leadership; then Christianity was introduced. Early in the twelfth century a bishopric was founded in the country by the aid of the King of Norway. It was from Greenland that Leif Ericson set forth upon the voyage in the course of which he is supposed to have reached America. The population centred in two districts on the west coast, Western Bygd and Eastern Bygd. Greenland was at first an independent State with a constitution, and in most respects followed in Iceland's course of development. About 1260 it was constituted a Territory of Norway, and thus came into the union of Sweden and Denmark at the close of the fourteenth century. It was prosperous in this new epoch, but its prosperity was before long cut short by European troubles, and by the black-death epidemic which visited it and Iceland. Also the 'Skrællings' attacked the European settlements. Various misfortunes followed. A disastrous period of climate also fell upon the land. As a result Greenland became lost to the world, and remained practi-

cally a blank in history for upward of 200 years. Expeditions sent out by Denmark after 1579 to redeem the colony accomplished nothing. About that epoch, however, English explorers—Frobisher, Davis, Baffin, Hudson, and others—discovered various portions of the coast. It was not till after 1650 that Dutch whalers frequented the east coast.

In 1721 a Norwegian missionary, Hans Egede, with the support of the Danish Government, made a settlement at Godthaab on the west coast, and began to introduce Christianity anew among the Eskimo. During the eighteenth and nineteenth centuries the Danes have acquired control of that uninhabited portion of Greenland which extends from Angmagsalik on the east coast round Cape Farewell to Tessuisak on the west coast. Danish settlements, particularly Godhavn, were the last stopping-places of the English expeditions on the way to discover the northwest passage in the early part of the nineteenth century, and were well known to civilization through the reports of these explorers. The region above Melville Bay was explored by John Ross in 1818 and by Inglefield in 1852; but the geographical knowledge concerning this region is mainly due to Americans: Kane, Hayes, Hall, Greely, and Peary. One English expedition has passed beyond Cape York since the days of Inglefield—the British Admiralty expedition under Nares in 1875-76. The knowledge of Kane Basin and Kennedy Channel is due to Kane and Hayes, and the knowledge of the straits and bays above them as far as the Arctic Ocean is due to Hall. Nares's expedition traced the northwest coast of Greenland as far as Cape Britannica. Lockwood and Brainerd, of the Greely expedition, pushed farther along the northwestern coast-line to 83° 24′. Peary (1891-92) demonstrated that Greenland is an island and not a continent, as had been previously supposed, and that an archipelago lies beyond it to the north; he also reached at the northern end of this archipelago, in 1901, what is probably the most northerly land in the world (83° 39′). Several persons have attempted to cross the ice cap which covers the entire interior region of Greenland—among them, Nordenskjöld, Peary, and Nansen; but only Nansen and Peary have succeeded. In 1888, following closely plans laid before the world by Peary in 1886, Nansen made the first crossing of Greenland from Gyldenlöve Fjord on the east coast to Godthaab. Peary has three times crossed the northern portion of Greenland from Whale Sound to Independence Bay, 1892, 1894, and 1895. The east coast has been examined by various explorers, most important among them: Scoresby, Graah, Holm, Ryder, Koldeway (who discovered Franz Josef Fjord and the magnificent Cape Bismarck, 77° N. latitude), and Amdrup. Between Cape Bismarck and Independence Bay (82° 37′) this coast is unknown.

BIBLIOGRAPHY. Egede, *Description of Greenland* (London, 1745); Crantz, *History of Greenland* (London, 1820); Graah, *Expedition to East Greenland* (London, 1837); Inglefield, *Summer Search for Sir John Franklin* (London, 1853); Kane, *Arctic Explorations* (Philadelphia, 1856); Hayes, *The Land of Desolation* (London, 1871); *Manual of the Natural History, Geology, and Physics of Greenland and Adjacent Regions* (London, 1875), a scientific work prepared by the Royal Society, Arctic Committee; Davis, *Hall's North Polar Expedition* (Washington, 1876); Rink, *Danish Greenland* (London, 1877); the important series, *Meddelesler om Grönland* (16 vols., Copenhagen, 1879-95), of which Wandel, Norman, and Holm, *Greenland East Coast and Julianehaab Ruine*, vol. vi.; Warming, *Greenland Vegetation*, vol. xii.; Lauridsen, *Bibliographica Greenlandica*, vol. xiii., are of special value; Baffin, *The Voyages of W. Baffin, 1612-22*, edited by Markham (London, 1881); Heer, *Flora Fossilia Grönlandica* (7 vols., Zurich, 1882-83); Greely, *Three Years of Arctic Service* (New York, 1886); Nordenskjöld, *Grönland* (Leipzig, 1886); Nansen, *First Crossing of Greenland* (London, 1886); Peary, *Northward Over the Great Ice* (New York, 1898); Greely, *Handbook of Arctic Discoveries* (Boston, 1896).

GREENLEAF, SIMON (1783-1853). An American jurist. He was born in Newburyport, Mass.; began the practice of law in Maine in 1806, and on the establishment of its Supreme Court in 1820 became reporter. He was chosen professor of law in Harvard in 1833, but resigned in 1848 and was made professor emeritus. His most important work, *A Treatise on the Law of Evidence* (1842-53), has passed through fifteen editions. He also published: *Origin and Principles of Freemasonry* (1820), and *Examination of the Testimony of the Four Evangelists by the Rules of Evidence as Administered in Courts of Justice, with an Account of the Trial of Jesus* (1846).

GREENLET. See VIREO.

GREEN MANURING. The very old and widely employed practice of growing crops to improve the soil by plowing them under, usually while green. It is especially popular in temperate regions. Two classes of plants are used for green manuring: those that are capable of thriving in the surface soil on a limited supply of plant food, which is thus saved from loss by washing or leaching; and those that gather plant food from both the air and the subsoil and are thus able to increase the fertility of the surface soil. To the first class belong rye, buckwheat, rape, etc.; to the second the leguminous plants. The leguminous plants are peculiarly adapted to green manuring because they have the power to assimilate through their root tubercles the free nitrogen of the air, and thus enrich the soil by the added stores of this valuable fertilizing constituent. At the same time they send down long roots into the subsoil, and draw up supplies of plant food to the surface which would otherwise be unavailable to ordinary crops. Green manures increase the available plant food in soils not only by the stores gathered from the air and the subsoil, but by their decomposition they set free plant food already in the soil, and which would otherwise be unavailable. They also improve the physical properties of the soil by the humus they form when they decay. Among the most important leguminous green-manuring crops are red clover, crimson clover, cowpeas, and soja beans, but there are many others which are specially adapted to the purpose in particular regions. See also MANURES AND MANURING; SOIL; CLOVER.

GREEN MONKEY. A West African monkey (*Cercopithecus callitrichus*). It is one of the guenons, closely allied to the grivet, and about the size of a cat. As it is numerous in its

native forests, and is hardy in other climates, it is to be seen in most menageries; but its tendency is to grow vicious with age. One of its peculiarities is its complete silence. In color it has a greenish hue above, though the hairs are really tinted with a mixture of black and yellow. The extremities are darker, and the whiskers and under surface are yellowish, inclining in some individuals to decided orange color. Compare GRIVET; VERVET.

GREEN MOUNTAIN BOYS. The name given to the soldiers of Vermont in the Revolution, originally organized in 1775 by Ethan Allen (q.v.) to oppose the claims of New York State to the Vermont territory. The band held the Canadian passes against the British during the Revolution.

GREEN MOUNTAINS. The northernmost extension of the Appalachian system, spreading over a large part of Vermont, and extending northward toward the Gulf of Saint Lawrence, and southward under the names of the Hoosac Mountains, Berkshire Hills, and Taconic Mountains into western Massachusetts, Connecticut, and New York (Map: Vermont, C 4). They reach their greatest elevation in the northern and central parts of Vermont, the highest peak being Mount Mansfield, 4364 feet above sea-level; other important peaks are: Killington, 4241; Camel's Hump, 4088; Lincoln, 4078; and Jay, 4018 feet. The Green Mountains form a continuous watershed for the streams running into Connecticut River on the east, and the Hudson and Lake Champlain on the west. Geologically, they are mainly of primitive structure, consisting of granite, gneiss, etc., with a layer of old red sandstone on the western slope. The hills and even the highest peaks have a smooth and rounded surface, and their ascent is easy; the summits are covered with grass, and on the slopes are large forests of pine, hemlock, spruce, etc., as well as hardwood forests on the better lands. The soil is not well adapted for agriculture, but the pasturage is fine, and the streams give abundant water-power. The range contains valuable mineral deposits, including marble, iron, and manganese, slate, and some copper.

GREEN MOUNTAIN STATE. Vermont. See STATES, POPULAR NAMES OF.

GREENOCK, grēn'ok. An important seaport and manufacturing town in Renfrewshire, Scotland, on the left bank of the Firth of Clyde, 22 miles west-northwest of Glasgow (Map: Scotland, D 4). Its chief industries are ship-building, dating from 1760; sugar-refining, since 1765; the manufacturing of steam-engines, ironwork, chain cables, anchors, ropes, sails, paper, woolen goods, etc. Fisheries employ a large number of boats. Its harbor works, commenced in 1707, comprise six tidal basins, a wet dock, and five dry docks; at the Tail of the Bank outside it possesses the best anchorage in the Clyde. Trade is carried on with Ireland, North America, and the West and East Indies. Over 19,500 vessels of more than 3,500,000 tons enter and clear its port annually. The town is built irregularly, and extends for four miles along the shore and on the slopes of the adjacent hills. The central busy portion has overcrowded, narrow streets and lanes, but the west end has wide, well-paved streets, planted with trees, handsome residences, and an esplanade 1½ miles long. Besides fine municipal buildings, handsome churches and parks, the town contains various educational and charitable institutions, and the Watt Monument, an edifice dedicated to James Watt, the perfecter of the steam-engine, who was born at Greenock. The town owns its water-works, and its water-power is extensively used in the factories. It also owns its harbors, gas, electric-lighting plant, tramways, artisans' dwellings, and cemeteries. It is the seat of an American consular agency. In 1635 Greenock, an obscure fishing village, consisting of one row of thatched cottages, became a burgh of barony. It owes its growth and prosperity to the Shaw family, and to the Union of 1707, which facilitated foreign trade. Population, in 1891, 63,000; in 1901, 67,645. Consult Campbell, *Historical Sketches of the Town and Harbors of Greenock* (Glasgow, 1879-81).

GREENOUGH, grēn'ô, HORATIO (1805-52). An American sculptor. He was born in Boston, and received his earliest training in art from the carvers and modelers there, especially from a French sculptor named Binon, who modeled the bust of John Adams in Faneuil Hall. At the age of sixteen he entered Harvard College and graduated in 1825. While at Harvard he met Washington Alston, by whose influence his life appears to have been dominated. At Harvard, also, he made a thorough study of anatomy. The most important works of this early period were a bust of Washington, modeled from Stuart's portrait, and the original design for Bunker Hill Monument. After graduation, Greenough went to Rome, where Thorwaldsen was at this time living. During the latter part of his life his studio was in Florence. Among his most important works are a statue of "Ariel" (1826); a statue of Byron's "Wisdom;" the group of the "Chanting Cherubs;" a statuette, "Genius of America;" the statue of Washington, in the Capitol at Washington; colossal groups of the "Rescue" in the Capitol, which took eight years to complete. Among his bust portraits were John and John Quincy Adams, Henry Clay, Josiah Quincy, Samuel Appleton, Jonathan Mason, Thomas Colen, John Jacob Astor, John Marshall, and others. He was well known as a critic of art, his *Essays* having been printed several times. Consult Tuckerman, *A Memorial of Horatio Greenough* (New York, 1853).

GREENOUGH, JAMES BRADSTREET (1833-1901). An American Latinist, born at Portland, Maine. He graduated at Harvard College in 1856. After practicing law for a few years in Michigan, he accepted an appointment in 1865 to a Latin tutorship in Harvard College. In 1873 he was appointed assistant professor, and in 1883 professor of Latin, a position which he continued to hold until a few months before his death, when failing health forced him to resign. Professor Greenough is best known as editor of a series of Latin text-books for schools which have passed through many editions, and as the author of a *Latin Grammar*, which is widely used. He was the first to offer instruction in Sanskrit and comparative philology in Harvard College in 1872, and continued to teach these subjects in connection with his regular work in Latin until 1880, when an independent chair of Sanskrit was founded. He also was a prime mover in organizing the Society for the Collegiate

Instruction of Women, from which Radcliffe College was developed, and was the first chairman of its academic board. He was joint author with Prof. Lyman Kittredge of *Words and Their Ways in English Speech* (1901). Besides his more serious work, he wrote many graceful verses in both English and Latin.

GREEN'PORT. A village in Suffolk County, N. Y., 94 miles east by north of New York City; opposite Shelter Island, in Gardiner's Bay, with which it is connected by steam ferry, and on the Long Island Railroad (Map: New York, H 4). It is a popular summer resort, and has a fine land-locked harbor, accessible for the largest ships, and oyster, fishing, and boat-building interests. The water-works and electric-light plant are owned and operated by the municipality. Greenport was settled in 1831, and was incorporated in 1868. Population, in 1900, 2366.

GREEN RIVER. One of the head-streams of the Colorado River (q.v.). It rises in the Wind River Range, in the western part of Wyoming, and flows in a southerly direction into Utah, in the southeastern part of which State it joins the Grand River to form the Colorado (Map: Utah, B 2). Its length is about 500 miles. For the greater part of its course Green River flows through very deep, rugged cañons, and is, for the most part, too rough or shallow for navigation. By way of this river Major Powell and others have made perilous trips into the Grand Cañon of the Colorado.

GREEN RIVER. A large tributary of the Ohio. It rises in Lincoln County, near the centre of the State of Kentucky, flows in a generally westward, then northwestward, direction, joining the Ohio near Evansville, Ind. (Map: Kentucky, D 3). Its length is about 300 miles, and it is 200 yards wide at its mouth; locks and dams make it navigable for small steamers for 200 miles. It passes within a quarter of a mile of the mouth of the Mammoth Cave, and it has a subterranean affluent in the Echo River of the Cave. The lower valley of the Green River abounds in coal; its upper part contains limestone.

GREENROOM. In the theatre, a room, usually at the side of the stage, where actors wait during the intervals of their parts in the play, and from which the dressing-rooms lead. It also serves as a reception-room (in French, the *foyer des artistes*) where actors meet friends and callers at the close of the play. The name is derived from the hangings and furnishings, which at an earlier period were uniformly green. No such uniformity prevails at the present day, and many greenrooms are very meagrely furnished.

GREENS. A common name for any green herbage boiled as a vegetable for the table. Spinach, young beet-tops, dandelion-leaves, kale, and mustard are the principal plants used for this purpose, though in early spring, when the appetite craves something green, the foliage of many other plants is used. The culture of the above plants is noted under their names.

GREENSAND. A name given to greenish, clayey, or sandy deposits of which the mineral glauconite (a hydrated silicate of potassium and iron) is the predominant constituent, but which contain particles of other minerals, such as quartz, feldspar, hornblende, pyroxene, and garnet. Greensand occurs in formations as old as the Cambrian, but it is most abundant in Cretaceous strata. In the Atlantic coast region the deposits are distributed over wide areas, and in places attain considerable thickness. Here three beds have been recognized, known as the Upper, Middle, and Lower Greensand, all of Cretaceous age. In Europe the deposits occurring in the Cretaceous are divided into the Upper and Lower Greensand. The Upper Greensand consists of beds of sand, generally green in color, with included masses of calcareous grit called firestone. The strata on the cliffs of the Isle of Wight are 100 feet thick. The Lower Greensand is made up of indurated sandstones and clays, with occasional calcareous beds, and has a thickness of 800 or 900 feet. Between the two formations is the series of strata known as the Gault. See CRETACEOUS SYSTEM.

GREENSBORO, grēnz'bŭr-ō. A town and the county-seat of Hale County, Ala., 100 miles west by north of Montgomery; on a branch of the Southern Railroad (Map: Alabama, B 3). It is the seat of the Southern University (Methodist Episcopal, South), opened in 1859, and of the Greensboro Female Academy. The most important industries are farming and cotton-growing. Greensboro, first settled in 1816, is governed under a charter of 1898, which provides for a mayor, chosen biennially, and a council, elected on a general ticket. The town is in the heart of the famous 'black belt' of Alabama. Population, in 1890, 1759; in 1900, 2416.

GREENSBORO. A city and the county-seat of Greene County, Ga., 88 miles east-southeast of Atlanta; on the Georgia Railroad (Map: Georgia, C 2). It is surrounded by an agricultural region, largely interested also in dairying, and has a cotton-mill, a cottonseed-oil mill, a cotton-ginnery, and a creamery. The water-works are owned by the city. Population, in 1890, 1313; in 1900, 1511.

GREENSBORO. A city and the county-seat of Guilford County, N. C., 82 miles west by north of Raleigh; on the Southern and the Cape Fear and Yadkin Valley railroads (Map: North Carolina, C 1). It is the seat of the Greensboro Female College (Methodist Episcopal, South), opened in 1846, the State Normal School for white women, the State Agricultural and Mechanical College for colored students, and Bennett College for negroes. The city carries on a considerable trade in tobacco, coal, and iron, and manufactures spokes and handles, bent rims, bobbins, cotton-mill supplies, cotton goods, flannels, carpets, saw-mill machinery, flour, brick, and tile, etc. Under a charter of 1900, the government is vested in a mayor, elected biennially, a municipal council, and administrative officials, appointments of whom are divided between the mayor and the city council. The city owns and operates its water-works and electric-light plant. Greensboro was settled in 1808, and received its first charter in 1870. The battle of Guilford Court House (q.v.) was fought, March 15, 1781, five miles northwest of Greensboro. Population, in 1890, 3317; in 1900, 10,035.

GREENS'BURG. A city and the county-seat of Decatur County, Ind., 47 miles southeast of Indianapolis; on the Cleveland, Cincinnati, Chicago and Saint Louis, and other railroads (Map: Indiana, D 3). It is the centre of a fertile agricultural region, and has an abundant supply

of natural gas. There are large stone-quarries, flour-mills, and carriage and chair factories. The city has a beautiful park, and the State Odd Fellows' Home. The government is administered by a mayor, chosen every four years, and a unicameral council. Population, in 1890, 3596; in 1900, 5034.

GREENSBURG. A borough and the county-seat of Westmoreland County, Pa., 31 miles east by south of Pittsburg; on the Pennsylvania Railroad (Map: Pennsylvania, B 3). It has an extensive trade in coal which is mined in the vicinity, and manufactures glass, iron, and brass goods, engines, nuts and bolts, lumber, bricks, flour, etc. There are several private institutions for secondary education. Near Greensburg stood the village of Hanna's Town, which was destroyed by the Indians in July, 1782, and in which, it is said, was held in 1773 the first regularly constituted court of justice west of the Alleghany Mountains. Population, in 1890, 4202; in 1900, 6508.

GREENSHANKS. A widely distributed 'telltale' sandpiper (*Totanus nebularius*) of the Old World, which visits Great Britain and Southern Europe in winter, and offers sport for gunners during its migrations. It is related to, and is about the size of, the American yellowlegs, but differs in coloration. The plumage is mostly dusky brown on the upper parts, the feathers edged with yellowish white; the under parts are white, and the legs dull olive, 'green' only by contrast with the pinkish tint of those of the redshanks (q.v.). It is graceful in flight, and adds interesting traits of its own to the general behavior of its race. It breeds in Northern Scotland, in Scandinavia, and Siberia; and in winter many go to South Africa and even to Australia. The 'green sandpiper' of England is a quite different bird (*Tringa ochropus*).

GREEN SICKNESS. See CHLOROSIS.

GREENSLEEVES. An old English ballad, first printed in 1580 as "A New Northern Dittye of the Lady Greene Sleeves," though the ballad was popular before that time. It appeared in *A Handefull of Pleasant Delites*, 1584, as "A New Courtly Sonet of the Lady Greensleeves, to the new tune of Greensleeves." The lively tune, the air of 'Christmas comes but once a year,' has been popular since the time of Elizabeth. Shakespeare mentions it twice in *The Merry Wives of Windsor*. The words are found in Child's *English and Scottish Ballads*, and the tune in Chappell's *Old English Popular Music* (1893).

GREEN SNAKE. A name given to several serpents prevailingly green, and including some poisonous Oriental species. The green snake of the United States, however, is a harmless and beautiful colubrine (*Liopeltis vernalis*). It is small, extremely slender, and in color grass-green above, lighter on the sides, and yellowish white beneath. It feeds upon insects, is agile in climbing, and often festoons itself upon the branches of a bush, where it is almost invisible among the leaves.

GREENS'POND. A port of entry on a barren island of the same name in the north of Bonavista Bay, on the east coast of Newfoundland. It has a safe harbor and is an important sealing station. Population, in 1901, 1358.

GREENSTONE. A term loosely applied to rocks of basic composition which have a greenish color due to the abundance of the hornblende which they contain. Most greenstones are diorite (q.v.) or altered diabase. The term 'greenstone' is obsolescent, and is used chiefly to describe collectively rocks which have not been carefully studied.

GREEN'S TU QUOQUE, OR THE CITIE GALLANT. An extremely clever comedy, by John Cooke (1614). The name was due to the comedian Green, who took the part of Bubble.

GREEN STURGEON. See STURGEON.

GREEN THURSDAY (Lat. *dies viridium*). The Thursday preceding Good Friday; called also Maundy Thursday. The name first came into use about 1200, and its origin is variously referred to the Twenty-third Psalm, the usual selection for the day, and to the custom of partaking of spring herbs on that day. Green Thursday was made a Christian feast day toward the end of the seventh century to commemorate the institution of the Lord's Supper.

GREEN TURTLE. A large, vegetable-feeding marine turtle (*Chelonia mydas*), which occasionally makes its way as far north as Long Island Sound. It feeds on the eel-grass (Zostera). This is the turtle of turtle-soup fame, and may attain a weight of 350 pounds. The flesh of the Pacific form, at proper seasons, is said to be superior to that of the Atlantic species. The eggs are prized for food. They are buried in the sand along the shores of the islands of the South Atlantic. The turtles are captured while ashore at night laying the eggs, or more often are taken in nets, and sometimes they are speared when swimming, and are transported alive to the Northern markets. See TURTLE.

GREENUK. See GAZELLE.

GREEN VAULT (Ger. *Grünes Gewölbe*). A section of the Royal Palace at Dresden, so called from the color of the walls of one of its apartments, the 'Green Vault,' properly so called. It contains a valuable collection of artistic curiosities, particularly of the seventeenth and eighteenth centuries, comprising ivory and crystal carvings, goldsmith's work, jewels, mosaics, enamels, and weapons. Among its chief treasures are the largest onyx in the world, and a carving by Dinglinger representing the Court of the Great Mogul Aurungzebe in 132 figures of gold.

GREEN'VILLE. A city and the county-seat of Butler County, Ala., 44 miles southwest of Montgomery; on the Louisville and Nashville Railroad (Map: Alabama, C 4). It has cotton-gins, lumber-mills, and a red-cedar factory, and is a market of considerable importance for lumber and cotton. Population, in 1890, 2806; in 1900, 3162.

GREENVILLE. A city and the county-seat of Bond County, Ill., 50 miles east by north of Saint Louis, Mo.; on the Vandalia Line and other railroads (Map: Illinois, C 5). It has a public library, and is the seat of Greenville College (Free Methodist), opened in 1892. The city is the centre of an agricultural and coal-mining region, and manufactures lumber, flour, bricks, wagons, condensed milk, etc. Population, in 1890, 1868; in 1900, 2504.

GREENVILLE. A city in Montcalm County, Mich., 40 miles northeast of Grand Rapids; on

Flat River, which supplies abundant water-power, and on the Pere Marquette and the Toledo, Saginaw and Muskegon railroads (Map: Michigan, H 5). It has manufactures of flour, refrigerators, lumber and lumber products, agricultural implements, etc., and is an important market for agricultural produce, particularly for potatoes. The water-works are owned by the municipality. Population, in 1890, 3056; in 1900, 3381.

GREENVILLE. A city and the county-seat of Washington County, Miss., about 140 miles south by west of Memphis, Tenn.; on the Mississippi River, and on the Southern and the Yazoo and Mississippi Valley railroads (Map: Mississippi, D 4). It has steamboat connection with various river ports, an extensive trade in cotton, being the centre of a remarkably productive cotton-growing region, and several cottonseed-oil mills, large cotton-compresses, lumber-mills, etc. There are public parks and playgrounds, and the city owns its water-works. Population, in 1890, 6658; in 1900, 7642.

GREENVILLE. A city and the county-seat of Darke County, Ohio, 36 miles northwest of Dayton; on Greenville Creek, and on the Cleveland, Cincinnati, Chicago and Saint Louis, the Pittsburg, Cincinnati, Chicago and Saint Louis, and other railroads (Map: Ohio, A 5). It has a considerable trade in lumber, a foundry and machine-shops, lumber-mills, and fence-works. The surrounding country is agricultural. There are a Carnegie public library, a fine court-house, an infirmary, and a children's home. The government is vested in a mayor, elected biennially, and a unicameral council. The city owns and operates its water-works. Greenville is built on the site of an Indian village, and was the home from 1805 to 1809 of Tecumseh (q.v.) and his brother the Prophet. After the battle of Fallen Timbers in 1794, General Wayne spent the winter of 1794-95 here, and on August 3, 1795, concluded his famous treaty with the Indians. Greenville was first incorporated in 1832. Population, in 1890, 5473; in 1900, 5501.

GREENVILLE. A borough in Mercer County, Pa., 85 miles north by west of Pittsburg; on the Shenango River, and on the Erie, the Pennsylvania, and other railroads (Map: Pennsylvania, A 2). It is the seat of Thiel College (Lutheran), opened in 1870. The borough has several coal-mines, and its manufacturing interests include railroad shops, tube-mills, foundries and machine-shops, saw and planing-mills, woolen-mills, flour-mills, carriage and wagon works, etc. Good water-power is derived from the Shenango River. Population, in 1890, 3674; in 1900, 4814.

GREENVILLE. A city and the county-seat of Greenville County, S. C., 160 miles northeast of Atlanta, Ga.; on the Southern, the Atlantic Coast Line, and the Columbia and Greenville railroads (Map: South Carolina, B 2). It is noted as an educational centre; among its institutions are Furman University (Baptist), opened in 1852; Greenville Female College (Baptist), opened in 1854; Greenville College for Women, opened in 1894; and Chicora College (Presbyterian) for women. The city has numerous industrial establishments, including cotton-mills, foundries, carriage and wagon works, and smaller plants. Settled in 1784, Greenville was incorporated in 1831. The government is administered under a charter of 1885 by a mayor, chosen biennially, who appoints the board of health and police commission; and a unicameral council, which elects the clerk, treasurer, chief of fire department, and sextons of cemeteries. Population, in 1890, 8607; in 1900, 11,860.

GREENVILLE. A city and the county-seat of Hunt County, Texas, 56 miles northeast of Dallas; on the Missouri, Kansas and Texas, the Texas Midland, and other railroads (Map: Texas, G 3). It is surrounded by an agricultural section, and has a large cotton trade, cotton-compress, cottonseed-oil mills, etc. The city is the seat of Burleson and Holiness colleges, and has two public parks. Settled in 1844, Greenville was incorporated in 1875, the charter of that date still being in operation. The government is administered by a mayor and a municipal council elected every two years. The city owns and operates its electric-light plant. Population, in 1890, 4330; in 1900, 6860.

GREEN VITRIOL, or Copperas. The commercial hydrated ferrous sulphate, which crystallizes in green monoclinic prisms. It is prepared by heating iron wire or ferrous sulphide in a dilute solution of sulphuric acid, filtering the solution, and concentrating the filtrate to crystallization. It is also found native as the mineral melanterite, usually as an efflorescence resulting from the decomposition of pyrite or marcasite.

GREEN'WALD, Emanuel (1811-85). An American theologian, born near Frederick, Md. After studying privately and receiving his license from the Lutheran Synod of Maryland in 1831, he settled at New Philadelphia, Ohio, which, until 1851, was his headquarters for general work among the scattered Lutherans of the Middle West. He subsequently held pastorates at Columbus, Ohio, Easton, Pa., and Lancaster, Pa. He was the founder and for many years the editor of the *Lutheran Review;* was president of the Pennsylvania Ministerium, the oldest Lutheran Synod in America, from 1873 to 1877, and the next year presided over the Lutheran Diet, assembled in Philadelphia. His published works include: *The Lutheran Reformation* (1867); *The Foreign Mission Work of Louis Harms* (1868); *Sprinkling the True Mode of Baptism* (1876); *The True Church: Its Way of Justification and Its Holy Communion* (1876); and *Romanism and the Reformation* (1880). He also published several books for children.

GREEN'WAY, Thomas (1838—). A Canadian statesman, born in England, who came to Ontario in 1844 with his father, a farmer. He took up land in Manitoba in 1878, and was elected member of Parliament for Mountain the following year. In 1887 he became head of the Liberals and therefore Prime Minister of Manitoba when his party came into power. His administration was noted for attempts to do away with French as an official language in the province and also to abolish the separate schools.

GREENWEED. A name given to certain half-shrubby species of Genista, a genus of the natural order Leguminosæ. Dyers' greenweed (*Genista tinctoria*), a species one or two feet high, with lanceolate leaves and terminal spiked racemes of pale-yellow flowers, is frequent in woods, meadows, and hilly pastures in most parts of Europe, in the temperate parts of Asia, and

in New York and Massachusetts, where it has become established. Its branches, leaves, and flowers—particularly the flowers—yield a fine yellow dye, chiefly used for wool; its flowers mixed with woad yield a fine green dye. Formerly it was in great esteem as a dyestuff, but other substances have now almost entirely supplanted it. The leaves and seeds were also formerly used in medicine; the former as a diuretic, the latter as a mild purgative. Hairy greenweed (*Genista pilosa*), abundant in some parts of Europe, is cultivated, particularly upon light and sandy soils in France, as food for sheep, which are very fond of it. It is a slender, branched, tortuous, and procumbent plant, with small pale-yellow flowers. Some of the species are used to keep sand from drifting and others for covering rocky and otherwise bare places. See BROOM.

GREEN'WELL, DORA (1821-82). An English writer of religious poetry and prose. She was born and spent her youth in Durham, but lived latterly in London, where her mature poetry was published: *Carmina Crucis* (1869); *Songs of Salvation* (1873); *The Soul's Legend* (1873); and *Camera Obscura* (1876). Her essays and other prose works, such as *The Patience of Hope*, *The Covenant of Life and Peace*, evidence her exalted religious convictions.

GREENWICH, grĭn'ĭj *or* grēn'ĭj. A metropolitan borough of London, England, in Kent, a former town on the right bank of the Thames, five miles southeast of Saint Paul's Cathedral (Map: England, G 5). It is noted for the Greenwich Hospital (q.v.), and Royal Naval College (q.v.), and for the Greenwich Royal Observatory, established in 1675, from the meridian of which British astronomers and geographers, and to a great extent those of other nations, calculate their longitude, and whence 'Greenwich time' is telegraphed twice daily to all parts of the United Kingdom. The observatory crowns a hill 180 feet high, in Greenwich Park, a favorite Sunday and holiday resort of Londoners. Greenwich was a royal residence from the thirteenth to the seventeenth century, and was the birthplace of Henry VIII., Queen Mary, and Queen Elizabeth. The borough has extensive engineering establishments, iron steamship-building yards, rope-works, and factories. Population, in 1891, 166,223; in 1901, 185,149. Consult Richardson, *Greenwich, Its History, Antiquities, Improvements* (Greenwich, 1834).

GREENWICH. A borough in a town of the same name, Fairfield County, Conn., 28 miles northeast of New York City; on Long Island Sound and on the New York, New Haven and Hartford Railroad (Map: Connecticut, A 5). It is a handsome village, popular as a summer resort and as a residential suburb of New York City. Population, in 1900, 2420; of town, 12,172.

Greenwich was first settled in 1640 by Captain Daniel Patrick. It was part of the Dutch province of New York from 1642 until 1650, when, by the agreement of a Dutch and English commission, it became part of Connecticut, and was selected as one of the points to mark the boundary. On February 25, 1779, a troop of 1200 English and Tories under Governor Tryon marched against the place, which was defended by General Putnam with about 100 militia. The latter were soon forced to retreat. On December 4, 1781, a small body of militia defeated a much larger body of Tories at Greenwich. Consult: *History of Fairfield County, Connecticut* (Philadelphia, 1881), and Mead, *A History of the Town of Greenwich* (New York, 1857).

GREENWICH HOSPITAL. An institution for naval pensioners, founded by William III. in memory of his Queen. The buildings were sufficiently completed by 1705 (at a cost of £50,000) to admit 100 disabled seamen. By July 1, 1708, 350 had been admitted. The income derived from bequests, the original royal grant, and from contributions made under coercion by sailors, amounted to £12,000 a year, half of which was expended in maintaining the charity, and the other half in completing the buildings. In the reign of George II. the forfeited estates of the Earl of Derwentwater were granted to the hospital, and produced an additional income of about £6000 a year. The compulsory contribution of 6d. a month by every seaman, whether of the naval or merchant service, was in 1834 remitted, an annual grant of £20,000 from the consolidated fund being substituted. The income from all sources by 1865 had reached £150,000 a year, out of which were maintained 1600 pensioners, and the necessary executive and medical officers, nurses, and servants. Many widows of sailors were employed as nurses or servants.

In 1865 the institution ceased to exist as an asylum for aged sailors, while its funds were converted into out-pensions, providing for a larger number than were maintained in the hospital. The buildings, after lying vacant during the following five years, became a royal naval college. All officers in the combatant branch of the service, on reaching the rank of midshipmen, as well as a number of engineers, were obliged to take a course of study in this college.

At the present time attached to the hospital, and consolidated with it, is a school for the gratuitous education of one thousand sons of seamen, under the superintendence of the commissioners of the hospital. The education given is such as to fit the recipients for either the navy or the merchant service. The term of study is from three to four years. In the 'great hall' there are several pictures of memorable naval battles, and of the nation's heroes who took part in them, while chief among the cherished exhibits is the coat Nelson wore at Trafalgar.

GREENWOOD, GRACE. See LIPPINCOTT, SARA JANE (CLARKE).

GREENWOOD LAKE. A picturesque sheet of water, partly in Orange County, N. Y., and partly in Passaic County, N. J., 49 miles northwest of Jersey City, with which it has direct railway communication. The lake is ten miles long with a maximum width of one mile; it has several good hotels on its shores, and is a favorite residential place and summer resort on account of its boating, angling, and bathing facilities.

GREER, DAVID HUMMELL (1844—). An American clergyman of the Episcopalian Church. He was born in Wheeling, Va. (now West Virginia), was educated at Washington College, Pennsylvania, and the Protestant Episcopal Seminary, Gambier, Ohio, and was rector successively at Covington, Ky., in Providence, R. I. (1871-88), and of Saint Bartholomew's, New York. In 1897 he was elected Bishop Coadjutor of Rhode Island, but declined the office. His published works in-

clude: *The Historical Christ; Moral Power of History* (1890); *From Things to God* (1893); and *The Preacher and His Place* (1895).

GREER, James Augustin (1833—). An American naval officer, born in Cincinnati, Ohio. He entered the navy in 1848, and graduated as midshipman at Annapolis in 1855. In 1861 he was serving as a lieutenant on the *San Jacinto* when Mason and Slidell were seized aboard the *Trent*. During the naval campaigns of 1863 he took part in the siege of Vicksburg and in the Red River expedition. In the following year he was stationed at the naval recruiting office in Cincinnati to correct abuses there, and during the winter of 1866-67 was for four months the protector of American interests at Acapulco, Mexico. He commanded the *Tigress* of the *Polaris* relief expedition in 1873, and was made captain in 1876. The *Constitution*, *Constellation*, and *Hartford* were successively under his command. He served on various naval boards, was in command of the United States European Naval Station from 1887 to 1889, and in 1892 was made a rear-admiral. He was retired in 1895.

GREG, William Rathbone (1809-81). An English essayist. He was born in Manchester, was educated under Dr. Lant Carpenter and at the University of Edinburgh, and at first entered business, but after 1850 devoted himself to literary pursuits. In 1856 he was appointed commissioner of customs, and later became comptroller of the stationery office. His writings, chiefly on political and social topics, include the following: *Creed of Christendom* (1851); *Essays on Political and Social Science* (1853); *Literary and Social Judgments* (1869); *Political Problems* (1870); *Enigmas of Life* (1872); *Rocks Ahead* (1874); *Mistaken Aims and Attainable Ideals of the Working Classes* (1876); and *Miscellaneous Essays* (1882). Consult a biographical sketch in Morley, *Critical Miscellanies* (London, 1893).

GREG'ARINE (from Neo-Lat. *Gregarinus*, from Lat. *gregarius*, pertaining to a herd, from *grex*, herd). A parasitic protozoan of the group Sporozoa (q.v.).

GREGG, David McMurtie (1833—). An American soldier, born in Huntingdon, Pa. He studied for a time at the University of Lewisburg, graduated at West Point in 1855, and served in many Indian campaigns on the Western frontier until the outbreak of the Civil War. He was made colonel of the Eighth Pennsylvania Cavalry Volunteers, took part in the Peninsular Campaign, and in 1862 was promoted to be brigadier-general of volunteers. Until August, 1864, he commanded various cavalry divisions of the Army of the Potomac, participating in the battle of Gettysburg, the Richmond campaign, and other important operations, and being brevetted major-general of volunteers for his distinguished conduct throughout the war. From August, 1864, until his resignation in 1865 he commanded all the cavalry of the Army of the Potomac. He was United States consul at Prague, Bohemia, from February to June, 1874; succeeded General Hancock as commander of the Pennsylvania Commandery of the Loyal Legion in 1886; and in 1891 was elected Auditor-General of the State.

GREGG, John Irvin (1826-92). An American cavalry officer, born in Belleforte, Pa. He served in the Mexican War, rising to the rank of captain in September, 1847. He entered the Civil War as captain in the Third Cavalry. Very soon afterwards he was transferred to the Sixth and later was made colonel of the Sixteenth Pennsylvania Cavalry. From April, 1863, to April, 1865, he commanded a cavalry brigade in the Army of the Potomac, and fought in the battles of Gettysburg and Cold Harbor. He was severely wounded in the action at Deep Bottom and again at Cornelia Court-House. At the close of the war he was brevetted major-general of volunteers and brigadier-general in the Regular Army. In 1866 he was commissioned colonel of the Eighth Cavalry, and in 1879 was retired.

GREGG, William (1817—). A Canadian Presbyterian divine, born in Donegal, Ireland, of Scottish parents, and educated in Glasgow and Edinburgh universities. He came to Canada in 1846, and after taking several pastoral charges in Ontario entered Knox College, Toronto, in 1864 as lecturer, and was professor of apologetics until 1895. His few published works are of a religious nature.

GREGOIR, gre-gwär', Edouard Georges Jacques (1822-90). A Belgian composer and author, born at Turnhout, near Antwerp. After studying with Rummel he gave numerous pianoforte concerts, and made several tours (1842) with the violinists Maria and Teresa Milanollo. After 1850 he devoted himself to composition and literary work. His eight operas, produced either in Brussels or Antwerp, were relatively unimportant: he is better known for his choruses, songs, and violin music; but his claim to remembrance rests chiefly on his work as historian and biographer. His studies on the musical history of Belgium and the Low Countries, his biographical collections, and his researches in various fields of music lore are of enduring value. Among his numerous publications are: *Histoire de l'orgue* (1865), which contains biographical notes on Belgian and Dutch organists; *Les artistes-musiciens néerlandais* (1864); *Les gloires de l'opéra et la musique à Paris* (1880), in three volumes, embracing the period 1392-1750. His large library was left to the Antwerp Music School. He died at Wyneghem.

GRÉGOIRE, grā'gwär', Henri (1750-1831). Constitutional Bishop of Blois, in France. He was born of poor parents at Vého, near Lunéville, December 4, 1750. He received his education from the Jesuits at Metz and Nancy, and entered into orders. In 1788 he published *Essai sur la régéneration civile, morale et politique des Juifs*, which attracted considerable notice and was crowned by the Academy of Metz. He had meanwhile become curé of Embermesnil, in Lorraine, and at the election for the States-General in 1789 he was chosen one of the Deputies of the clergy. An ardent democrat in all his views, he deserted his own class for the Third Estate, and immediately began to play a prominent part in the Revolution. He was one of those who advised the secession of the Third Estate, and became one of the secretaries of the National Assembly. He was one of the most enthusiastic advocates, on the night of August 4th, of the abolition of the privileges of the nobles and clergy. He also gave his support to the civil

constitution of the clergy, and later accepted election as a constitutional bishop from the Department of Loire-et-Cher, taking the title of Bishop of Blois, although the old Bishop (De Themines) was still alive. In the debates of the Convention Grégoire continued to be prominent as the representative of his diocese. He was an ardent advocate of the abolition of the kingship and the establishment of a republic. He favored the condemnation of Louis XVI., but sought, by proposing the suspension of the death penalty, to save the life of the unfortunate monarch; nor would he vote for his execution. Already, in 1789, Grégoire had figured as an advocate of negro emancipation, and in 1793 he further interested himself in behalf of the oppressed race, the result being that by a decree of February 4, 1794, slavery was abolished in all the French possessions. After returning from an important diplomatic mission to Savoy in 1793, Grégoire acted on the Committee of Public Instruction, and devised measures for the protection and as far as possible the encouragement of art, science, and literature. On November 7, 1793, when Gobel, the recreant Bishop of Paris, renounced the Catholic religion and proclaimed the cult of Reason, Grégoire, who was pressed to do likewise, bravely refused. He showed his tolerant spirit by advocating the granting of full civil rights to Jews resident in France. Throughout the later phases of the Revolution, and under the Directory, Grégoire continued to take part in public affairs; and to his activity are due many of the measures connected with the public organization of literature and science which still form a part of the French system of administration. After the 18th Brumaire he became a member of the Five Hundred, and in 1801 was raised to the Senate. He opposed the proclamation of the Empire, and after the conclusion of the concordat between Pius VII. and Bonaparte he ceased to exercise his ecclesiastical functions. Although he was created a Count of the Empire and an officer of the Legion of Honor, Grégoire resisted every step toward the establishment of the absolute authority of Napoleon, and in 1814 he was one of the first to pronounce against him. On the Restoration he was most earnest in demanding from Louis XVIII. the acceptance of the Constitution. During the Hundred Days he attracted no notice; but after the second return of the King he was excluded from the Senate, and, when chosen as a Deputy from the Department of Isère, in 1819, his election was annulled. The last years of his life were spent in poverty and obscurity, for he had been expelled from the Institute and refused his pension as an ex-Senator. He died at Auteuil, May 28, 1831, unreconciled to the Church, which refused him the last offices of religion.

Grégoire was a voluminous writer on political and ecclesiastical subjects, among his most important works being: *Histoire des sectes religieuses* (1810), and *Essai historique sur les libertés de l'église gallicane* (1818). For his life, consult: Carnot (editor), *Mémoires ecclesiastiques, politiques et littéraires de Grégoire* (Paris, 1839); Gregory, *Grégoire, the Priest and the Revolutionist* (Leipzig, 1876); Pressensé, *L'église et la révolution française* (Paris, 1864); Grazier, *Etudes sur l'histoire religieuse de la révolution française* (Paris, 1887).

GREG'ORAS, NICEPHORUS (c.1295-1359). A priest in Constantinople, who proposed a reformation in the calendar by a plan which came very near exactness. He was a theological controversialist, was much involved in the disputes between the Eastern and Western branches of the Church, and engaged in a dispute with Barlaam (q.v.). He wrote a history of the Byzantine Empire from 1204 to 1359. It is published in Migne, *Patrologia Græca*, cxlviii., cxlix.

GREGO'RIAN CHANT. The ritual music of the early Christian Church, as revised and introduced by Pope Gregory the Great. How much of a revolution he really made in the then existing Ambrosian forms is a disputed question. There can be, however, no doubt that he began certain needed reforms by the rejection of frivolous embellishments and the establishment of the whole musical system on a more representative basis. A full discussion of the development of mediæval Church music will be found under PLAIN CHANT. See also SACRED MUSIC; MODES.

GREGO'RIA'NUS. A Roman jurist of the third century. Little is known of his life except that he compiled the collection of laws known as the *Codex Gregorianus*, a work which, although transmitted to us in a very imperfect form, is said to have furnished the basis for the later Code of Justinian. Evidences of its value may be found in the frequent references to it by the later lawgivers of the Roman Empire. It was compiled probably about the close of the third century.

GREGOROVIUS, grĕg-ō-rō'vĭ-ŭs, FERDINAND (1821-91). A German historian and poet, born at Neidenburg, East Prussia, and educated at Königsberg. He began his travels in Italy in 1852, and wrote in a novel and original manner the series *Wanderjahre in Italien* (1857-77). In 1880 he traveled in Greece, and in 1882 in Egypt, Syria, and Turkey; then lived alternately at Rome and Munich until his death in 1891. In the same vein as the *Wanderjahre* are: *Corsica* (3d ed. 1878; translated into English); *Figuren: Geschichte, Leben und Scenerie aus Italien* (1856); *Siciliana* (1860); *Lateinische Sommer* (1830); *Die Insel Capri* (1868, 3d ed. 1897); *Von Ravenna bis Montana* (1871); and *Apulische Landschaften* (1877). To an earlier period belongs his poetical and critical work, including: *Werdomar und Wladislaw* (1845); *Goethes Wilhelm Meister in seinen sozialistischen Elementen*, a very valuable critique (1849); *Die Polen- und Magyarenlieder* (1849); the tragedy *Der Tod des Tiberius* (1851); and the idyllic epic on Pompeii, *Euphorion* (6th ed. 1891). To his historical works belong the *Geschichte des römischen Kaisers Hadrian* (1851; and revised, 1884, under the title *Der Kaiser Hadrian*), and the great works on mediæval Italy: *Die Grabdenkmäler der Päpste* (2d ed. 1881), and the *Geschichte der Stadt Rom im Mittelalter* (8 vols., 1859-72; 4th ed. 1886-95), translated into English by Hamilton, from the fourth German edition, as *History of the City of Rome in the Middle Ages* (1894-1900). An Italian translation appeared at Venice at the expense of the Roman municipality in 1874-76. The work is scholarly and original, and in matter and manner ranks as one of the greatest historical studies of the century. Further studies in Roman history are: *Lucrezia Borgia* (3d ed.

1875); *Urban VIII. im Widerspruch zu Spanien und dem Kaiser* (1879), and *Una pianta di Roma delineata da Leonardo da Besozzo Milanese* (1883). Gregorovius also published: *Kleine Schriften zur Geschichte und Kultur* (1887-92); *Athenais, Geschichte einer byzantinischen Kaiserin* (1882); *Geschichte der Stadt Athen im Mittelalter* (2d ed. 1889); and an edition of the *Briefe Alexanders von Humboldt an seinen Bruder Wilhelm* (1880). Among his posthumous works are: *Gedichte*, edited by Schack (1892); *Römische Tagebücher*, edited by Althaus (2d ed. 1893); and *Briefe von Ferdinand Gregorovius an den Staatssekretär Hermann von Thile* (1894). Consult Münz, *Ferd. Gregorovius und seine Briefe an Gräfin Lovatelli* (Berlin, 1896).

GREG'ORY (Lat. *Gregorius*). The name of sixteen popes and two antipopes.—GREGORY I., the Great (Pope 590-604). He was born in Rome about 540 of an illustrious family, and was a lawyer by profession. As early as 571 he was made prætor of Rome by the Emperor Justin II. By the death of his father he inherited much wealth, which he used for religious purposes. He founded six monasteries in Sicily and one in Rome, with the title of Saint Andrew's, and, resigning his office, withdrew from the world and retired to the latter. Previously he had bestowed on the poor his costly robes, his gold, jewels, and furniture, and, refusing the abbacy of the convent, he began with the lowest monastic duties and devoted himself altogether to God. This was probably about 575. It was while he was still in this monastery that he met the Anglo-Saxon youths in the slave market, and being struck by their beauty, and learning that they came from a pagan land, resolved to devote himself to the conversion of that land to Christianity. He set forth on his journey; but the clamor of the Romans at his loss led the Pope, Benedict I., to compel his return, and eventually to enroll him in the secular ministry by ordaining him one of the seven regionary deacons of Rome. Benedict's successor, Pelagius II., sent Gregory as Nuncio to Constantinople to implore the Emperor's aid against the Lombards. He resided in Constantinople from 578 to 585, during which time he commenced and perhaps completed his great work, the *Exposition of Job*. On his return to Rome he reëntered his monastery and became abbot, and on the death of Pelagius was unanimously called by the clergy, the Senate, and the people to succeed him. He used every means to evade the dignity, but was forced to yield, and was consecrated September 3, 590. Few pontiffs have equaled, hardly one has surpassed, Gregory as the administrator of the concerns of the vast charge assigned to him. To him the Roman Church is indebted for the complete and consistent organization of her public services and the details of her ritual, for the regulation and systematization of her sacred chants. The mission to England, which he was not permitted to undertake in person, was intrusted by him (597) with all the zeal of a personal obligation to Augustine (see AUGUSTINE), and under his auspices Britain was brought within the pale of Christian Europe. Under him the Gothic Kingdom of Spain, long Arian, was united to the Church. Nor was his zeal for the reformation of the clergy and the purification of the morality of the Church inferior to his ardor for its extension. On occasion of the threatened invasion of Rome by the Lombards, Gregory performed the part of a true king in protecting the State, and in his general administration he was, in fact, if not yet in avowed authority, a temporal sovereign. As regards the general government of the Church, Gregory reprobated very strongly the assumption by John, Patriarch of Constantinople, of the title of œcumenical or universal bishop, especially as the object of John in assuming this title was to justify an exercise of jurisdiction outside of the limits of his own partriarchate. In his writings, too, the details of the whole dogmatic system of the modern Church are very fully developed. He died in Rome, March 11, 604. His posthumous fame is of the highest, and he is one of the four greatest doctors of the Western (Latin) Church. His works are in Migne, *Patrologia Latina*, lxxv.-lxxvi. The best edition of his *Letters* is by Ewald and Hartmann (Berlin, 1891-93). In English have appeared: *The Book of Pastoral Rule*, and many epistles in *Nicene and Post-Nicene Fathers*, second series, vols. xii. and xiii., with prolegomena; his book of *Dialogues* (London, 1874), from which there are extracts in *Little Flowers of Saint Benet, Gathered from the Dialogues* (London, 1901); his *Morals in the Book of Job*, in "A Library of the Fathers of the Holy Catholic Church," vols. xviii., xxi., xxiii., xxxi. For his life, consult Pfahler (Frankfort, 1852), of which the first volume only was published; Barmby (London, 1879); Snow (London, 1892); Kellett, *Pope Gregory the Great and His Relations with Gaul* (London, 1889).

GREGORY II. (Pope 715-31). He was born in Rome in 669, and educated at the Lateran. His pontificate is specially noticeable as forming an epoch in the progress of the territorial preëminence of the Roman See in Italy. The authority of the Eastern emperors in the West had sunk into little more than a name, and the tyrannical and barbarous measures by which the Emperor Leo the Isaurian attempted to enforce his decrees against image-worship (see LEO III.; ICONOCLASM) weakened still more the tie which bound Italy to the Eastern emperors. The natural result of the diminution of the Imperial authority in Italy was the growth of that of the Pope, to whom the deserted Italian provinces looked, partly as their spiritual counselor and head, partly as their mediator with the barbarous enemy, partly as the centre of the political federation of self-defense which their isolation necessitated. Gregory convened a council in Rome on the subject of the honor due to images, and addressed an energetic letter to the Emperor. He died in Rome, February 10, 731. His *Epistolæ et Canones* are in Migne, *Patrol. Lat.*, lxxxix. Consult Dahmen, *Das Pontifikat Gregors II.* (Düsseldorf, 1888).—GREGORY III. (Pope 731-41). He was a Syrian by birth, and followed the policy of his predecessor, Gregory II. In 739 he sent a deputation to Charles Martel, soliciting his succor against the Lombards, and proposing, if it was granted, to recognize him as protector of the Romans, and to confer on him the title of 'Consul and Patrician of Rome.' This offer was made by the Pope "in virtue of a decree of the Roman Primus," and is of great historical importance in the consideration of the nature and origin of the Papal power in Italy. Owing to the pressure of the war with the Saracens, the embassy failed, but it was a step toward the consummation of

the independence of the West. Gregory bestowed the pallium on Boniface, the Apostle of Germany (732). He died in Rome, November 28, 741. His extant writings are in Migne, *Patrol. Lat.*, lxxxix. and xcviii.—GREGORY IV. (Pope 827-44). He was a native of Rome. He tried unsuccessfully to arrange the quarrel between Louis the Pious (q.v.) and his sons, and rebuilt Ostia as a defense for the mouth of the Tiber. His *Epistolæ* are in Migne, *Patrol. Lat.*, cvi.—GREGORY V. (Bruno of Carinthia) (Pope 996-99). He was the first German Pope, a relative of the Emperor Otho III. His authority was disputed by an antipope, John XVI. (997-98). His *Epistolæ* are in Migne, *Patrol. Lat.*, cxxxvii.—GREGORY VI. (John Gratianus) (Pope 1045-46). He had been a priest in Rome, and bought the Papacy from Pope Benedict IX. The facts leaked out and the Emperor took him prisoner, after having compelled his resignation (1046), and brought him to Germany. He died in 1048 at Cologne. His *Epistolæ* are in Migne, *Patrol. Lat.*, cxlii.—GREGORY VI. was also the title of an antipope to Benedict VIII. in 1012.

GREGORY VII. (Hildebrand) (Pope 1073-85). Preëminently the representative of the temporal claims of the mediæval Papacy. He was born in Tuscany about 1020, perhaps at Soana, a village of the southern border. His family belonged to the plebeian class. Although nothing of his remoter ancestry is known, his family name, Hildebrand, would imply a Teutonic descent; but by birth and education at least he was Italian. His youth was passed in Rome, in the Monastery of Saint Mary, on the Aventine, of which his uncle was abbot, and he probably took monastic vows. The Emperor Henry III. took him to Germany, and he continued his studies in Cologne. Very likely he also visited Aix-la-Chapelle and Cluny. He attended the council at Worms at which Bishop Bruno of Toul was chosen Pope (Leo IX.), and the latter took him to Rome (1049) and made him a cardinal subdeacon. He had great influence during the pontificate of Leo. On the latter's death (1054) the Roman people manifested a desire to have Hildebrand as successor; but this honor he declined, preferring to gain more experience. Besides important domestic employments which were assigned to him, he was sent as legate to the Council of Tours (1054), in which the cause of Berengarius was examined. (See BERENGARIUS OF TOURS.) He was likewise one of the three legates dispatched to Germany to consult about a successor to Leo IX. Under the four popes who followed Leo—Victor II., Stephen IX., Benedict X., and Alexander II., known in history as the German popes—Hildebrand continued to be the predominant power, and inspired into their government of the Church the great principles to which his life was devoted. Three days after the death of Alexander II. he was unanimously elected at Rome; but he declined to be consecrated until the Emperor's sanction had been gained. The German bishops, who feared the reforms of which his name was a guaranty, endeavored to prevent the Emperor Henry IV. from assenting to the election; but Henry gave his approval, and the new Pope was crowned July 10, 1073. Regarding as the great evil of his time the thoroughly secularized condition of the Church in a great part of Europe, and especially in Germany and Northern Italy, Gregory directed against this all his efforts. In his reforming crusade he first attacked the evil of clerical marriage and the probably much less frequent offense of clerical incontinence. These he combated by stirring up the people to refuse the sacraments from any other than a celibate and pure priest. Simony also was denounced in the most explicit and vigorous terms. But it was against the fundamental abuse of investiture (q.v.) that his main efforts were directed. In 1075 he prohibited this practice under the pain of excommunication both for the investor and the invested, and in the following year he actually issued that sentence against several bishops and councilors of the Empire. The Emperor Henry IV. (q.v.) disregarding these menaces and taking the offending bishops under his protection, Gregory cited him to Rome to answer for his conduct. Henry's sole reply was a haughty defiance, and in a Diet at Worms, in 1076, he formally declared Gregory deposed from the Pontificate. Gregory was not slow to retaliate by a sentence of excommunication; and in this sentence, unless revoked or removed by absolution in twelve months, by the law of the Empire at the time, was involved the forfeiture of all civil rights and deposition from every civil and political office. When, at a Diet held at Tribur (September, 1076), the bishops actually began to discuss the election of a new Emperor, Henry deemed it necessary to appear to yield. Accordingly he sought the Pope, who was then at the castle of Matilda, Countess of Tuscany, at Canossa (q.v.). He arrived there with his wife and son in the dead of a very severe winter. Gregory himself is authority for the statement that the Emperor, "having laid aside all belongings of royalty, wretchedly, with bare feet and clad in wool, continued for three days [January 25-27, 1077] to stand before the gates of the castle," and it was not till the pitiful state of the royal penitent moved all hearts that the Pope admitted him to his presence and absolved him. Henry's submission, however, was but feigned; and on his subsequent triumph over his rival, Rudolf of Swabia, he resumed hostilities with the Pope, and in 1080 again declared him deposed, and caused to be appointed in his place the antipope Guibert, Archbishop of Ravenna (see GUIBERT OF RAVENNA), under the name of Clement III. After a protracted siege of three years Henry, in the year 1084, took possession of Rome. Gregory shut himself up in the Castle of Saint Angelo. Just, however, as Gregory was on the point of falling into his enemy's hands, Robert Guiscard, the Norman Duke of Apulia, entered the city, set Gregory free, and compelled Henry to return to Germany; but the wretched condition to which Rome had been reduced obliged Gregory to withdraw, first to Monte Cassino, and ultimately to Salerno, where he died, May 25, 1085. His dying words were: "I have loved justice and hated iniquity; therefore I die in exile." Gregory's writings and literary remains are in Migne, *Patrol. Lat.*, cxviii. His *Epistles* were separately edited at Paris (1877); a selection was translated (London, 1853). The literature upon him is abundant, but that written prior to 1850 is superseded by more critical work. Of chief value and interest may be mentioned: Gfrörer, *Papst Gregorius VII. und sein Zeitalter* (Schaffhausen, 1859-61; index vol. 1864); Villemain, *Life of Gregory VII.* (trans. London, 1874); Stephens, *Hildebrand and His Times* (London, 1886); Delarc, *Saint Grégoire VII. et la réforme*

de l'église au XIème siècle (Paris, 1889-90); Vincent, *The Age of Hildebrand* (New York, 1896). For the numerous special discussions, and in general, consult: Cerroti, *Bibliografia de Roma mediævale e moderno*, vol. i. (Rome, 1893); Chevalier, *Repertoire des sources historiques du moyen âge* (Paris, 1887; supplement, 1888).

GREGORY VIII. (Pope 1187). He succeeded Urban III., October 21, 1187, and died eight weeks later. His *Epistolæ et Privilegia* are in Migne, *Patrol. Lat.*, ccii. Consult the dissertation of Nadig, *Gregors VIII. 57 tägiger Pontifikat* (Basel, 1890).—GREGORY VIII. was also the title taken by Mauritius Burdinus, Archbishop of Braga, set up as antipope to Gelasius II. by the Emperor Henry V. in 1118. He was taken prisoner by the successor of Gelasius, Calixtus II., in 1121, and died in captivity, 1125.—GREGORY IX. (Ugolino, Count of Segni) (Pope 1227-41). He followed the policy of Gregory VII., and had a long dispute with the Emperor Frederick II. (q.v.), whom he twice excommunicated. The Emperor marched upon the Papal territories, took Ravenna, and intercepted a fleet from Genoa which was conveying a hundred Church dignitaries to Rome. Gregory died before the trouble was settled. He instituted the Inquisition and gave it in charge to the Dominicans. For his life, consult: Balan (Modena, 1872-73); J. Marx, *Die Vita Gregorii IX. quellenkritisch untersucht* (Berlin, 1890); Auvray (editor), *Les registres de Grégoire IX., 1227-35* (Paris, 1890-96). His *Epistolæ* are in D'Achery, *Spicilegium*, vol. iii. (Paris, 1723).—GREGORY X. (Teobaldo de' Visconti) (1210-76) (Pope 1271-76). He was born at Piacenza, Italy, 1210; at the time of his election (1270) he was in the Holy Land as a crusader. He arrived at Rome, March 13, 1271, and was consecrated Pope March 27th. He held at Lyons the fourteenth general synod for action upon (1) the Greek schism, (2) the Saracen oppression of the Holy Land, and (3) the moral degeneracy of the times. The synod was opened by the Pope in person, May 7, 1274. He exerted himself to attain the ends sought, and succeeded as far as the council was concerned. But the plans for a crusade came to nothing; the union with the Greeks was short-lived, and the times did not noticeably improve. He died in Rome, January 10, 1276. Consult J. Guiraud (editor), *Les registres de Grégoire X.* (Paris, 1892-98).—GREGORY XI. (Pierre Roger de Beaufort) (1331-78) (Pope 1370-78). He was born in 1331, chosen Pope at Avignon, Provence, 1370, and was the last of the French popes. At the request of the Romans, and influenced by the pleadings of Saint Catharine of Siena, he returned to Rome in 1377, and there he died, March 27, 1378. The works of Wiclif came under his censure.—GREGORY XII. (Angelo Corrario) (1327-1417) (Pope 1406-15). He was a Venetian, and was chosen Pope in 1406. He was deposed by the Council of Pisa (1409), but held on till at the Council of Constance (1415) he voluntarily abdicated. (See CONSTANCE, COUNCIL OF.) He died as Cardinal Bishop of Porto, October 18, 1417.

GREGORY XIII. (Ugò Buoncompagno) (Pope 1572-85). He was born in Bologna, February 7, 1502. He was educated in his native city, where he held the professorship of law for several years. He settled in Rome in 1539, and was one of the theologians of the Council of Trent (q.v.). On his return to Rome he was created cardinal in 1564, and sent as legate to Spain. On the death of Pius V., Gregory was elected Pope in 1572. He showed great zeal for the promotion and improvement of education; a large proportion of the colleges in Rome were wholly or in part endowed by him, and his expenditure for educational purposes is said to have exceeded 2,000,000 Roman crowns. The most interesting event of his pontificate is the correction of the calendar (see CALENDAR), which was the result of long consideration, and was finally proclaimed in 1582. When the news of the massacre of Saint Bartholomew reached Rome, Gregory and his cardinals solemnly celebrated the event at the Church of San Marco, on September 6, 1572, as the suppression of a conspiracy not alone against Charles IX., King of France, but also against the Church, as Cardinal Hergenröther states. In the same year he had a medal struck, with his portrait on the obverse, and on the reverse an angel bearing a cross and sword, while the inscription reads, *Hugonotorum strages* ('Overthrow of the Huguenots'). Gregory did much to help the Jesuits. He died in Rome, April 10, 1585, in the eighty-third year of his age. He published in 1582 a valuable edition of the *Decretum Gratiani*.—GREGORY XIV. (Niccolò Sfondrato) (?-c.1591) (Pope 1590-91). He was a native of Cremona. He put Henry IV. of France under the ban (1591).—GREGORY XV. (Alessandro Ludovisio) (1554-1623) (Pope 1621-23). He was born in Bologna, 1554. Although an old and infirm man when chosen Pope, his pontificate, thanks to his nephew, Ludovico Ludovisio, whom immediately after his elevation he made cardinal at the early age of twenty-five, was a very successful one. The Counter-Reformation (q.v.) accomplished much in Bohemia, Austria and Hungary; the Congregation for the Propagation of the Faith was established, and the Papal Conclave as at present carried on; and to him is due the secret balloting in the Papal election.

GREGORY XVI. (Bartolommeo Alberto Cappellari) (1765-1846) (Pope 1831-46). He was a Venetian, who became a Camaldolese monk, ultimately rose to the head of the Order, was learned in Eastern languages, and a teacher of theology. When Napoleon carried Pius VII. away as a prisoner in 1809, Cappellari left Rome for his native place, and remained in quiet for three years. On the return of the Pope (1814) he was promoted to various important positions, and in 1826 was made a cardinal and the prefect of the Propaganda (q.v.). In this capacity he was practically Minister of Foreign Affairs. He made an agreement with the Netherlands regarding Roman Catholic citizens, regulated Church matters in the United States, and secured emancipation for the Catholics in Armenia from the Sultan. He was elected to the Papacy February 2, 1831, and for 15 years was zealous and energetic in promoting the interests and expanding the power and influence of the Church. He was a munificent patron of architecture, engineering, and literature. His famous work, *The Triumphs of the Papacy* (Rome, 1799), has been translated into German and French, and incorporated in Migne's *Démonstration évangélique* (vol. xvi.). He was a bad financier and left the Papal treasury in difficulties. For his life, consult: Sylvain (Paris, 1889); Cardinal Wiseman, *Recollections of the Last Four Popes, and of Rome in Their Times* (London, 1858); Gavazzi, *My Recollections of the Four Last Popes* (London, 1857).

GREGORY. (1) The servant of Capulet, in Shakespeare's *Romeo and Juliet*. (2) The fagot-making quack in Fielding's farce *The Mock Doctor*; reproduced from Molière's Sganarelle in *Le médecin malgré lui*.

GREGORY V. (1739-1821). A Greek Patriarch of Constantinople. He was born at Dimitzana in Arcadia, and was baptized Georgios Angelopulos. Educated at Mount Athos, he was an anchorite for many years; became Bishop of Smyrna (1784) and Patriarch of Constantinople (1795). At this time, during the difficulties between France and Turkey over Egypt, he was accused by the Turkish populace of treason and banished to Athos. His studies there made him a great educational power, when he was recalled to Constantinople in 1806, and contributed to his reinstatement as Patriarch in 1819 after a second banishment of eleven years. On the outbreak of the Greek Revolution, Gregory anathematized the rebels; but he was accused of giving them secret assistance, and on Easter Day, 1821, he was hanged by the Janizaries in his patriarchal robes at the main entrance of his own church, together with three bishops and eight novices. His body, which was mutilated and thrown into the sea, was rescued and buried in the cathedral at Athens. Gregory wrote a translation in modern Greek of the Epistles of Paul, with a commentary.

GREGORY, Order of Saint. A Papal order founded in 1831 by Gregory XVI., and reorganized in 1834. It was originally bestowed as a reward for services in defense of the Roman Church, but is now given for any distinguished achievement.

GREGORY, Caspar René (1846—). An American biblical scholar, born in Philadelphia, Pa. After graduating at the University of Pennsylvania in 1864, and at Princeton Theological Seminary in 1870, he studied at Leipzig, where he received the degree of Ph.D. in 1876. He rendered an important service to philology and biblical criticism in furthering the work left uncompleted by Konstantin Tischendorf (q.v.) and in discovering new manuscripts. He is one of the few Americans who have held academic positions in German universities—that of professor of New Testament exegesis in the theological faculty at Leipzig. He was connected editorially with the *Systematic Theology* of Dr. Charles Hodge (1870-73), and with Schürer and Harnack's *Theologische Litteraturzeitung* (1876-84). Under the title *Saint John the Author of the Fourth Gospel* (Edinburgh, 1875), he translated Luthardt's *Der Johanneische Ursprung des vierten Evangeliums*, and he also published a translation of the same author's *Das Johanneische Evangelium* as *Commentary on Saint John's Gospel* (1876-78). His original writings include pamphlets on Tischendorf (1875); *Les cahiers des manuscrits grecs* (1885); and the *Prolegomena* to Tischendorf's *Editio Octava Critica Major* of the New Testament, the three parts of which appeared in 1884, 1890, and 1893.

GREGORY, Daniel Seely (1832—). An American Presbyterian clergyman, born in Carmel, N. Y. He was educated at Princeton College and the Princeton Theological Seminary; was tutor in rhetoric at Princeton from 1858 to 1860, and held several Presbyterian pastorates up to 1871, when he was appointed professor of metaphysics and logic at Wooster University, and four years later was transferred to the chair of English literature. From 1878 to 1886 he was president of Lake Forest University. He received the degree of LL.D. from Wooster University in 1895. He was managing editor of the *Standard Dictionary*, and in 1895 became editor of the *Homiletic Review*. His publications include: *Christian Ethics* (1875); *Why Four Gospels?* (1876); *The Tests of Philosophic Systems* (1886); with S. B. Halliday, *The Church in America and Its Baptisms of Fire* (1896); and *The Crime of Christendom* (1900).

GREGORY, David (1661-1708). A Scottish astronomer. He was born in Aberdeen, and was educated at Marischal College and at the University of Edinburgh. Shortly before graduating at the latter institution in 1683, he had been appointed professor of mathematics there, holding this position for eight years, during which time he added extensively to the methods of quadratures discovered by his brother James Gregory (q.v.), besides actively advocating the philosophy of Newton. From 1691 until his death he was Savilian professor of astronomy at Oxford; was elected a fellow of the Royal Society in 1692, and in 1705 was made honorary fellow of the Edinburgh Royal College of Physicians. His most important writings, besides numerous papers in the *Proceedings* of the Royal Society, are: *Exercitatio Geometrica de Dimensione Figurarum* (1684); *Catoptricæ et Dioptricæ Elementa* (1695); *Astronomiæ Physicæ et Geometricæ Elementa* (1702); and *Euclidis Opera Omnia* (1703). Several manuscript treatises and notes on Newton's philosophy were found after his death; and in 1745 his lectures on mathematics were published as *A Treatise of Practical Geometry*.

GREGORY, Edward John (1850—). An English genre painter, born at Southampton. He was a pupil at the Art School in his native town, and then studied at South Kensington. He first exhibited at the Royal Academy in 1875, and was made Royal Academician in 1898. His works include: "Saint George" (1876); "The Signal;" "A Rehearsal" (1882); "Drawing-Room Day;" "The Swans of the Thames;" "Sir Galahad;" and "Is It a Mouse?" He became known as a particularly dexterous painter of domestic genre subjects.

GREGORY, Eliot (1854—). An American artist and essayist, born in New York City. He studied both in Rome and Paris, and won the distinction of exhibiting both painting and sculpture in the Paris Salon, where his painting entitled "Children" received honorable mention. Besides portraits, his best-known pictures are "Soubrette" (1883), and "Coquetterie" (1884). Under the pen-name of "An Idler," he published two volumes of essays, *Worldly Ways and By-Ways* (1898), and *The Ways of Men* (1900), for the most part made up of clever though superficial reflections upon current American society.

GREGORY, Francis Hoyt (1789-1866). An American naval officer, born in Norwalk, Conn. He entered the merchant service in 1807, was appointed a midshipman in the United States Navy in 1809, served on several vessels, engaged in the suppression of the slave trade, and on the outbreak of the War of 1812 was attached to the command of Commodore Chauncey on Lake Ontario. In 1814 he was captured by the British,

and confined as a prisoner in England until the close of hostilities. In 1815-16 he served against the Algerine pirates, and in 1821-23, in command of the *Grampus*, took part in the expeditions against pirates in the West Indies and the Gulf of Mexico. He became a captain in 1838, and commanded the *Raritan* of the blockade squadron during the Mexican War. From 1849 to 1852 he was in command of the African squadron. In July, 1861, he was made superintendent of the construction of the new iron war-vessels, and attained the rank of rear-admiral on the retired list in July, 1862.

GREGORY, JAMES (1638-75). A Scotch mathematician and inventor, born at Aberdeen. At the age of twenty-three he invented the reflecting telescope known by his name, which he described in a work entitled *Optica Promota*. He then went to Padua, where he spent about two years, devoting himself to studies in the mathematical sciences. In 1667 he produced his *Vera Circuli et Hyperbolæ Quadratura*, followed, in 1668, by two other works, *Geometricæ Pars Universalis*, and *Exercitationes Geometricæ*. On his return to London, he was elected a fellow of the Royal Society, and in 1669 he obtained the professorship of mathematics at Saint Andrews. In 1674 Gregory was called to Edinburgh to fill the chair of mathematics.

GREGORY, JAMES (1753-1821). A Scottish physician, born at Aberdeen. He studied at the University of Edinburgh and at Christ Church, Oxford, where he acquired a considerable knowledge of the classics; graduated from the medical department of the University of Edinburgh in 1774, and continued his studies at Continental universities until 1776. Upon his return he was made professor of medicine at Edinburgh, and in 1777 commenced to lecture at the Royal Infirmary. In 1790 he became professor of the practice of medicine, and continued lecturing upon that subject until his death. He was universally acknowledged to be the foremost medical practitioner and lecturer in Scotland during his maturity; but he preferred to display his great mental powers in versatile controversy rather than in the advancement of the medical science. In 1809 he became involved in a long argument against a recommendation to allow more freedom to members of the Edinburgh medical faculty, was charged with divulging university proceedings, and was suspended from fellowship in the college. His principal writings are: *De Morbis Cœli Mutatione Melendis* (1774); *Conspectus Medicinæ Theoreticæ* (2 vols., 1780-82); *Theory of the Moods of Verbs* (1790); *Philosophical and Literary Essays* (1792); *Memorial to the Managers of the Royal Infirmary* (1780); *Historical Memoirs of the Medical War in Edinburgh in the Years 1785-86-87;* and *Epigrams and Poems* (1810).

GREGORY, JOHN (1724-73). A Scotch physician, grandson of James Gregory, the mathematician. He was born at Aberdeen, was educated there, at Edinburgh, and at Leyden; was professor of philosophy at Aberdeen from 1746 to 1749; became professor of the practice of physic at Edinburgh in 1766; and enjoyed a high reputation as a teacher and practicing physician. His complete works were published at Edinburgh in 1788.—His son, Dr. JAMES GREGORY (1753-1821), became distinguished as professor of the practice of medicine at Edinburgh, and was a leading man in his profession. He was the author of *Literary and Philosophical Essays* (1792).

GREGORY, JOHN MILTON (1822-98). An American educator, born at Sandlake, N. Y., and educated at Union College. After a brief study of law he took up theology, and was ordained as a pastor in the Baptist faith; but he soon abandoned his pastoral duties for educational work in the West. He was appointed principal of a classical school in Detroit, Mich., and served as State Superintendent of Public Instruction from 1858 to 1863. In 1854 he assisted in the establishment of the *Michigan Journal of Education*, which he edited for several years. He was president of Kalamazoo College, Mich., from 1863 to 1867, and of the Illinois Industrial University from 1867 to 1880. In 1873 he served as United States Commissioner to the World's Fair at Vienna, and he was a member of the United States Civil Service Commission from 1882 to 1885. His publications include: *Handbook of History* (1866); *Map of Time* (1866); *New Political Economy* (1882); *Seven Laws of Teaching* (1883); and *Political Economy* (1887).

GREGORY, OLINTHUS GILBERT (1774-1841). An English mathematician, born at Yaxley, Huntingdonshire. He was professor at the Royal Military Academy, Woolwich, from 1807 to 1838. His most important contributions to physical science were his experiments (1823) to determine the velocity of sound. He was one of the projectors of London University; edited the *Gentleman's Diary* (1802-19), and the *Ladies' Diary* (1819-45); and published treatises on astronomy and mechanics, *Letters on the Evidences of the Christian Religion* (1811), and memoirs of *John Mason Good* (1828), and of *Robert Hall* (1833).

GREGORY, WILLIAM (1803-58). A Scotch chemist, grandson of John Gregory, the physician. From 1844 until his death he was professor of chemistry in Edinburgh University. He carried out a number of original investigations in chemistry; wrote *Outlines of Chemistry* (1845); and edited in English several of Liebig's works. He also published *Letters to a Candid Inquirer on Animal Magnetism* (1851).

GREGORY OF ARMENIA, called THE ILLUMINATOR (c.257-332). The apostle of Christianity among the Armenians. Little is known of his early history, and the facts of his life are so mingled with fiction that it is difficult to separate them. He is said to have been born at Valarshabad, the capital of the Province of Ararat, Armenia, about 257, and educated at Cæsarea in Cappadocia, where at the same time he was instructed in the Christian religion. He afterwards entered into the service of Tiridates III., King of Armenia, by whom he was subjected to severe persecution on account of his refusal to worship idols. Some severe public calamity which succeeded being looked upon as a proof of Divine wrath, and the King being himself afflicted, both the ruler and his subjects put themselves under Gregory's instruction. The people were converted in great numbers, and churches immediately erected throughout the country; and Gregory, after receiving ordination at Cæsarea (302), returned as Metropolitan of Armenia, and baptized his converts. He is said to have retired from office in 331 to live in a

cave, and to have died there in 332. The memory of Gregory is held in great reverence in the Greek, Coptic, Abyssinian, and Armenian churches, and he is one of the saints of the Roman Catholic calendar. The discourses attributed to him are probably spurious. There are two lives in Armenian accessible, one in a French translation by Langlois in vol. i. of his *Historiens de l'Arménie* (Paris, 1867); and the other in the English translation by Malan, *Life and Times of Saint Gregory the Illuminator* (London, 1868); other lives and his works are in Migne, *Patrologia Græca*, cxvii.

GREGORY OF NA'ZIAN'ZUS, SAINT, called 'the theologian' (c.329-90). Bishop of Constantinople, and one of the 'three Cappadocians,' famous leaders of orthodoxy in the latter half of the fourth century, the other two being Basil the Great (of Cæsarea) and Gregory of Nyssa (q.v.). He was born probably in 329. His father, who bore the same name, was for many years Bishop of Nazianzus, a town in southwest Cappadocia, identified by Ramsay with the modern Nenizi. Gregory was born in the village of Arianzus. He enjoyed the best educational advantages, studying at Cæsarea of Cappadocia, at Cæsarea of Palestine, and at Athens, where Basil and Julian (afterwards Emperor) were among his fellow students. Some of the most celebrated rhetors of the fourth century were his teachers. Study and travel occupied all his time up to about his twenty-eighth year, when he returned home, and was baptized. He more than once visited his friend Basil, at his hermitage in Pontus, seeming inclined to remain there. But his unexpected ordination to the presbyterate, at the hands of his father, made it necessary for him to settle at Nazianzus, where he preached, and eventually exercised episcopal functions also, although never made bishop of that see.

After Basil had been persuaded to abandon his solitary life and assume the duties of Bishop of Cæsarea (370), he consecrated Gregory Bishop of Sasima, an obscure village, where he never actually served. This appointment temporarily threatened a rupture of the friendship between Basil and Gregory, as their letters show. Much more agreeable to Gregory was the invitation to come to Constantinople, as leader of the orthodox Christians of that frankly Arian city. At the head of the only Catholic parish in the capital, and in the face of public opinion overwhelmingly hostile to his views, Gregory's power as a preacher steadily gained for him influence and enlarged his following. He called his church *Anastasia* ('resurrection'), to symbolize the revival of the true faith, in opposition to Arianism. When the religious policy of Theodosius had turned the State Church back to orthodoxy, and the Second Ecumenical Council (Constantinople, 381; see CONSTANTINOPLE, COUNCILS OF) had registered its verdict correspondingly, Gregory was made Bishop of the patriarchal city, and Primate of the East. But opposition, arising in part from the defeated Arians, in part from criticism of his translation from Sasima, and in part from the disappointment of rival candidates, led Gregory speedily to resign his position. Weary of controversy, he withdrew from Constantinople, and passed the remaining eight or nine years of his life in quiet near his old home. He died in 389 or 390.

Gregory is famous chiefly as a theologian and defender of the orthodoxy of his time. To the three Cappadocians together is due the final triumph of the Nicene theology over Arianism, so far as that was independent of politics. And to Gregory belongs the credit of leading the way to this end, by formulating the orthodox doctrine in such a way as to command support. The result was the definition of the Trinity as consisting of one substance or essence and three hypostases or persons. (See HOMOOUSION; HYPOSTASIS.) If Athanasius emphasized the *oneness* of God, Gregory emphasized His *threefoldness*. And so far did he push this conception that he was charged with teaching tritheism. His theological system is best studied in the famous *Theological Orations*, five in number, originally delivered in Constantinople. We have from him forty other addresses and sermons, among them two denunciations of Julian the Apostate; many letters; and a considerable number of poems, partly autobiographical. Together with Basil, he prepared the *Philocalia*, a collection of excerpts from Origen of great value.

The best edition of Gregory's complete works is still the Benedictine (2 vols., Paris, i. edited by Clemencet, 1778; ii. edited by Caillau, 1840, reprinted by Migne, *Patrologia Græca*, vols. xxxiv.-xxxviii., Paris, 1857-62); a good modern edition of the *Five Theological Orations* is by Mason (Cambridge, 1899). The *Nicene and Post-Nicene Fathers*, 2d ser., vol. vii. (New York, 1894), contains an unsatisfactory translation of selected orations and letters. In general, consult Smith and Wace, *Dictionary of Christian Biography* (London, 1877-87), article "Gregorius Nazianzenius." For literary criticism, consult Krumbacher, *Geschichte der byzantinischen Litteratur* (2d ed., Munich, 1897).

GREGORY OF NYSSA, nīs'sâ, SAINT. A Greek Church father, who flourished during the latter part of the fourth century. He is one of the famous 'three Cappadocians' (Basil of Cæsarea, Gregory of Nazianzus, and Gregory of Nyssa), and a younger brother of Basil. The dates of his birth and death are uncertain, but he died after 394. Gregory's early education was of the best, and we see evidences of his rhetorical training in his fine literary style. There is no good reason to doubt that he was married. About the year 371 Basil forced Gregory to accept the bishopric of Nyssa, a village of Cappadocia, whose chief claim to distinction is that he presided over its church.

From the outset Gregory encountered opposition on the part of the Arians, who were numerous and powerful throughout the East, and who enjoyed Court favor under the Emperor Valens. A local synod deposed Gregory in 376, and he was banished by the Emperor's command. The death of Valens and the accession of Theodosius mark a turning-point in the history of Arianism, and usher in the triumph of the Nicene orthodoxy. Gregory was restored to his see (378), and from this time onward his sphere of influence widens. We find him journeying to Antioch, Palestine, Constantinople, and Arabia, everywhere aiding in establishing the Catholic faith. He was an influential member of the Second Ecumenical Council, held at Constantinople in 381. (See CONSTANTINOPLE, COUNCILS OF.) There is no reason to believe that he wrote the clauses said to have been added to the Nicene symbol at that time. (See NICENE

CREED.) But his influence upon the final formulation of the doctrine of the Trinity was considerable, especially in drawing a distinction between the one divine essence, or substance, and the three hypostases, or persons. (See ARIUS; HYPOSTASIS; HOMOOUSION.) He also emphasized the attributes of the three persons in the Trinity—viz. that the Father is eternally Father, unbegotten; that the Son is eternally begotten; and that the Holy Spirit eternally proceeds (from the Father). In addition to these fundamental articles of the faith, Gregory maintained certain ideas, derived from Origen, which never met with favor in the Church, notably the theory of a final restoration of all men to harmony with God (the *apokatastasis*). He visited Constantinople three times after the Council of 381. On one of these occasions he delivered funeral orations over the Princess Pulcheria and the Empress Flacilla. We hear of him for the last time in 394.

Gregory had none of those accidental marks of distinction which attach to popes and patriarchs. His episcopal see was insignificant, except as he himself shed lustre upon it. His place in history depends upon his service to the development of Catholic theology, and in particular to the formulation of the trinitarian dogma. His doctrinal views may be read in his extensive work *Against Eunomius* (who was a pronounced Arian); in his book *Against Apollinarius;* or in his *Great Catechism,* which was designed for the use of the clergy in dealing with candidates for admission to the Church. In his treatise on *The Soul and the Resurrection* we have an illustration of his power as a speculative philosopher; in that *On Virginity* we may examine one side of his ethical system, and also notice his regret that he is himself shut out by marriage from the more excellent life he praises. An adequate edition of his works is much to be desired.

BIBLIOGRAPHY. Migne, *Patrologia Græca*, vols. xliv.-xlvi. (Paris, 1863), gives the text of most of Gregory's works. An English translation by Moore and Wilson is given in *The Nicene Fathers,* second series, vol. v. (New York, 1893). In general, consult: the article "Gregorius Nyssenus," in Smith and Wace, *Dictionary of Christian Biography* (London, 1877-87); Harnack, *History of Dogma,* vol. iv. (English translation, London, 1898); Schaff, *History of the Christian Church,* vol. iii. (New York, 1889); Vollert, *Die Lehre Gregors von Nyssa vom Guten und Bösen* (Leipzig, 1897).

GREGORY OF TOURS, tōōr (Lat. *Gregorius Turonensis*), originally called GEORGIUS FLORENTIUS (538-94). A celebrated ecclesiastic, the chronicler of Frankish history. He was born in Auvergne, November 30, 538. His family was of high rank, and distinguished for piety, having furnished several bishops to the See of Tours. Gregory was educated under the direction of his uncle, Saint Gallus, Bishop of Clermont, and, after the latter's death, of Saint Avitus, also afterwards Bishop of Clermont. Ordained deacon (563), Gregory left Auvergne and went to the Court of Sigebert, King of Austrasia. In 573 he was elected to the See of Tours, and was consecrated by Giles Archbishop of Rheims. The first years of his episcopacy were a season of great perplexity, owing to the contentions of the Merovingian kings. By resisting royal authority on some occasions, he drew upon himself the hatred of Queen Fredegunda of Neustria, and the ire of her husband, King Chilperic. Gregory was accused of seditious and other treasonable actions, and summoned before a council of bishops in 580. Here, however, he defended himself with such clearness and vigor that Chilperic ceased to be his foe, and trusted him afterwards with many important political missions. No less favored by the King's successors, Guntram and Childebert II., Gregory did not fail to use all his influence with the Court for the amelioration of the position of the Church. His travels had, apart from their political purposes, at the same time the object of everywhere restoring peace and piety. His last journey seems to have been to Orleans, whither he accompanied the King in 593. He died at Tours, November 17, 594. Gregory's chief work is his *Historiæ Francorum Libri Decem* (Ten Books of Frankish History), the first attempt at French history. The style is crude, and the selection of topics and arrangement indiscriminate. There is a German translation in the *Geschichtschreiber der deutschen Vorzeit* (Berlin, 1887), and an English translation is announced. It has been separately edited by Omont and Colton (Paris, 1887-93). The *Miraculorum Libri Vii* and other minor writings were translated into French by Bordier (Paris, 1857-64). Gregory's complete works are in Migne, *Patrologia Latina*, lxxi.; the best edition is that by Arndt and Krusch, in the *Monumenta Germaniæ Historica: Scriptores Rerum Merovingicarum*, vol. i. (Hanover, 1885). For his biography, consult: Löbell (Leipzig, 1839; 2d ed. 1869); also Bonnet, *Le Latin de Grégoire de Tours* (Paris, 1890).

GREGORY THAU'MATUR'GUS (Gk. Γρηγόριος Θαυματουργός, *Grēgorios Thaumatourgos*, Gregory the Miracle-Worker), SAINT (c.210-70). Bishop of Neocæsarea in Pontus, his native city. Sprung from an illustrious and wealthy heathen family, he was educated as a rhetorician; but an acquaintance with Origen at Cæsarea, in Palestine, in 233, led him to give up the law, and apply himself under his new master to the study of the Holy Scriptures and Greek philosophy. When Maximin's persecutions forced Origen to leave Cæsarea, Gregory went to Alexandria, and stayed there for a time. Gordian having succeeded Maximin, Origen returned to Cæsarea, and Gregory went thither to renew his studies under him. Most probably it was at that period also that he was baptized, and changed his name from Theodorus to Gregory. Recalled to his family (238), instead of striving for those posts of honor for which he had been destined, he retired into solitude; but was so often besought to return and labor for the Church that he allowed himself to be consecrated Bishop of Neocæsarea about 240. The city was wealthy and populous, but utterly unchristian. Gregory applied himself to his work with the utmost zeal. According to the stories, he wrought many miracles, thereby winning his epithet, the 'Miracle-Worker.' During the persecution of Decius, which broke out in 250, Gregory fled, with a great part of his flock. In 251 the Emperor Decius died, and Gregory returned to Neocæsarea. He now instituted a general festival for those Christians who had fallen during the persecution, and permitted the faithful to celebrate it with banquets and sports like

those which accompanied heathen festivals—a proceeding by which he intended to draw over the pagan multitude to Christianity, but which has been severely blamed. In 265, with his brother Athenodorus, he was at the Council of Antioch, which had been convoked for the purpose of condemning the heresies of Paul, Bishop of Samosata. Whether Gregory also took part in the second council (270), necessitated by Paul's refusal to abdicate, is very uncertain. He died at Neocæsarea, 270. The genuine works of Gregory are a panegyric on Origen, delivered in public before his return to his native place; a creed said to have been revealed by the Virgin Mary; a paraphrase of Ecclesiastes, often and wrongly attributed to Gregory of Nazianzus; and a 'Canonical Epistle,' setting forth the punishments and penances to be undergone by such Christians as had bought booty from pagan soldiers. The first collected edition of his works was published by Vossius (Mayence, 1604); a more complete edition appeared in Paris (1622). They are in Migne, *Patrologia Græca*, x.; English translation in *The Ante-Nicene Fathers*, vi. (Buffalo, 1886-96). Much of our knowledge of Gregory comes from Gregory of Nyssa's life of him (in Migne, *Patrologia Græca*, x.). For his life, consult Ryssel (Leipzig, 1880).

GRÉGR, grē'gr', EDUARD (1828—). A Czech politician, born at Březhrad. He studied medicine, became a lecturer at Prague, and from 1861 was known for his active participation in Austrian political affairs. He assisted in founding the Young Czech Party, and was acknowledged its foremost spokesman. In 1861 he was elected to the Bohemian Diet, and in 1883 a Deputy to the Imperial Reichsrat. His programme sought the establishment of an independent Czech State, and hence brought him into severe opposition alike to the Old Czech faction, which he denounced for its conservatism, and the Germanizing element. See BOHEMIA, section on *History*.

GRÉGR, JULIUS (1828-96). A Czech politician, brother of Eduard Grégr, born at Březhrad. He was educated at Prague, and became distinguished as a publicist and legislator. For nearly thirty-five years he was a member of the Bohemian Diet. During his long career in these assemblies he was a prominent representative of the Young Czech Party, which he assisted in founding, and vigorously opposed the German influence in Bohemia. Owing to his equally strong opposition to the tactics of the feudalist Old Czech Party, he resigned his seat in the Austrian Reichsrat in 1880. The Czech organ, *Národni Listy*, was founded by him, in association with Rieger and Palacky, in 1861.

GREGUSS, grē'gōōsh, AUGUST (1825-82). An Hungarian critic, born at Eperies. He was a student at the University of Halle, became professor at Szarvas, and finally professor of æsthetics at the University of Budapest (1870). He is particularly known as an analyst and critic of Magyar poetry, and his works are written in that language. Some of them were translated into German by Gustav Heinrich (1875).

GREIF, grīf, MARTIN (adopted name of FRIEDRICH HERMANN FREY) (1839—). A German poet and dramatist. He was born at Speier, and was educated at Munich. His power of expression, as well as the nobility of thought and depth of sentiment expressed in his lyrics, entitles these to be ranked among the best modern productions of the kind in German. With the exception of the drama *Hans Sachs* (latest ed. 1894), his numerous productions appear under the name of Martin Greif. Among these are his collected poems, *Gedichte* (5th ed. 1889), and the dramas *Corfiz Ulfeldt, der Reichshofmeister von Dänemark* (2d ed. 1876); *Prinz Eugen* (1880); *Konradin, der letzte Hohenstaufe* (1889); *Ludwig der Bayer* (1891); and *General York* (1899).

GREIFSWALD, grīfs'wält. The capital of a circle of the same name in the Prussian Province of Pomerania, situated on the river Ryck, 18 miles by rail southeast of Stralsund, near the Baltic Sea (Map: Prussia, E 1). It is well built, equipped with modern improvements, and is surrounded by promenades laid out on the site of ancient fortifications. There are three mediæval Lutheran churches, of which the Gothic Saint Nicholas is the most conspicuous, owing to its high tower. The town hall is also an interesting old building, and there are a number of curious private houses—gabled brick structures dating from the fourteenth and fifteenth centuries. The University of Greifswald was founded in 1456. It has three faculties, with an attendance of over 800 students, and a library of 140,000 volumes, together with a number of interesting manuscripts. At the university is exposed every ten years the valuable Croy tapestry, belonging to the sixteenth century, and representing Luther preaching. There are a municipal gymnasium and a geographical and scientific museum. The chief manufacturing establishments are the royal railway shops, machine-works, chicory-factories, and ship-building yards. Sugar of lead, dried fish, and fruit preserves are exported. The trade is principally, however, in grain and wood. Population, in 1890, 21,624; in 1900, 22,950.

Greifswald received its municipal rights in the thirteenth century, and became in the same century a member of the Hanseatic League. It suffered greatly from frequent sieges, but regained its prosperity under the dominion of Sweden, into whose hands it fell in 1631. It became Prussian in 1815.

GREIN, grīn, MICHAEL (1825-77). A German philologist. He was born at Willingshausen, Hesse, was educated at Marburg and Jena, and in 1865 became archivist to the Elector of Hesse at Cassel. He was professor at Marburg from 1873 until his death. Besides several valuable translations of Anglo-Saxon poems, he published the work entitled *Bibliothek der angelsächsischen Poesie in kritisch bearbeiteten Texten, mit Glossar* (1857-64), a work of basic importance on Anglo-Saxon literature, and the first which may be regarded as a compilation of the various editions of the poems discussed. Unfortunately, Grein did not live to complete his other work, devoted to Anglo-Saxon prose, entitled *Bibliothek der angelsächsischen Prosa* (1872).

GREIZ, grīts. The capital of the German Principality of Reuss (Elder Branch), situated on both banks of the White Elster, 49 miles south of Leipzig (Map: Germany, E 3). The picturesque old town is on the right bank, the new town on the left. There are an old castle situated on a lonely rock, the residence of the Prince of Reuss, and a fine Gothic Rathaus, built in 1841.

The summer residence of the Prince stands in a large and beautiful park surrounded by wooded mountains, and the environs abound in romantic scenery. The town has a gymnasium, a 'real' gymnasium, and a seminary. It owns its waterworks, a gas and an electric plant, and a savings bank. Greiz is the seat of a highly developed textile industry, employing in the neighborhood of 10,000 people. The chief manufactures are dress-goods, woolens, shawls, quilts, etc. There are also a number of tanneries, cigar-factories, paper-mills, iron-foundries, machine-shops, etc. Population, in 1890, 20,141; in 1900, 22,346; nearly all Protestants.

GRELL, grĕl, August Eduard (1800-86). A German organist, born in Berlin. He was the pupil of Kaufmann, Ritschl, and Zelter. He entered the Singakademie in 1817, and was director of it for twenty years. He was Court organist and teacher of the cathedral choir, and teacher of composition at the Academy. His compositions are vocal, and usually sacred. Among them is an oratorio, *Die Israeliten in der Wüste;* a mass in sixteen parts, which has been given repeatedly in Europe and the United States; a four-part arrangement of the choral melodies of the Evangelical *Gesangbuch;* organ preludes, motets, cantatas, and hymns.

GRELLET', Stephen (originally Etienne de Grellet de Mabillier) (1773-1855). A Quaker missionary and philanthropist, born in Limoges, France, of a wealthy and noble family. He was originally a Roman Catholic, and was educated at the military college at Lyons. At the time of the Revolution he belonged to the bodyguard of Louis XVI. After the execution of the King he escaped and came to America. In 1795 he joined the Society of Friends. During the yellow-fever epidemic in Philadelphia, in 1798, he was untiring in his attentions to the sick and the dying. A little later he engaged successfully in business in New York, and after 1800 traveled as a missionary over much of the United States and Canada, and made two missionary tours in Europe, personally addressing the Czar and the Pope on the subject of religion. He died in Burlington, N. J. Consult Seebohm (editor), *The Life and Gospel Labours of Stephen Grellet* (3d ed., London, 1862).

GRE'MIO. Bianca's rich but aged suitor, in Shakespeare's *Taming of the Shrew.*

GRENADA, gre-nā'dȧ. A British island and colony, in the Windward group of the West Indies, situated northwest of Trinidad (Map: West Indies, R 8). Area, 133 square miles. The island is of volcanic origin, and contains several extinct craters and hot mineral and sulphur springs. In the centre rises a mountain ridge, with peaks about 3000 feet high, and outlying spurs interspersed with beautiful and fertile valleys. The picturesque coast is indented by fine bays and harbors. The island is well watered by numerous small streams, and the annual precipitation is excessive, sometimes amounting to 200 inches. One of the natural features of the island is the Grand Etang, a round lake two miles in circuit, 1800 feet above the sea; sanatoriums are established on its shores. Agriculture constitutes the chief occupation, and the area under cultivation exceeds 20,000 acres, mostly under cacao. The cultivation of sugar-cane was formerly the chief industry, but since the emancipation of the slaves and the division of the land into small holdings sugar has been almost completely replaced by cacao and spices. The annual commerce exceeds $2,500,000. The administration of the island is vested in a Governor and a legislative council of thirteen members, six officially nominated by the Governor and seven unofficially nominated by the Crown. Carriacou, the chief island of the Grenadines (q.v.), is an administrative dependency of Grenada. The capital, Saint George, the headquarters of the Government of the Windward Islands, situated on a strongly fortified bay on the southwest coast, has a fine harbor, capable of accommodating the largest vessels, and is an Imperial coaling station. Population of island, in 1901, 63,438, mostly colored. Grenada was discovered by Columbus in 1498, and was settled by the French in 1650-51. The commercial development of the island dates from 1714, when the French West India Company took up its exploitation. In 1762 Grenada was captured by the British, from whom it was retaken by the French in 1779, but restored in 1783. Consult *The Grenada Handbook* (London, 1898); also the authorities referred to under British West Indies.

GRENADE (Fr. *grenade,* from Sp., Port. *granada,* grenade, pomegranate, from Lat. *granatus,* filled with grains, from *granum,* seed; ultimately connected with AS., Eng. *corn*). A small explosive shell, thrown from the hand. They were formerly in general military use, and were regarded as being particularly effective when thrown among troops making an assault. They have been long obsolete. See Grenadier.

GRENADIER. Originally a soldier detailed and equipped for the throwing of hand grenades. They were tall men, selected because of special qualifications for the purpose; afterwards separate companies of grenadiers were formed, in France about 1670, and in England soon afterwards. The flank company or companies of every infantry regiment, because of their superior height, were known as grenadier companies. The grenadier regiments of modern European armies belong in every instance to royal household troops or select guard corps. See Grenade.

GRENADIER. A book name for a large family of pelagic fishes, Macruridæ, allied to the cods, which inhabit the deep parts of the ocean, and often present extraordinary shapes. They are frequently called 'onion-fishes' by the fishermen, or 'popeyes,' on account of the size and shape of their eyes, which are large and prominent, as is usual among deep-sea animals. They occur frequently in the Western Atlantic, and sometimes in forms that are edible. They are known to fishermen through their proclivity for stealing bait and making off with trawl-line hooks. The species best known to the fisherman and the largest is *Macrurus rupestris,* called 'rat-tail fish,' as well as 'onion-fish.' This form abounds off the North Atlantic coast, and reaches a length of three feet, and a weight of four or five pounds. Prominent genera are Bathygadus, Steindachneria, Chalinura, Coryphænoides, Hymenocephalus, Macrurus, Cœlorhynchus, and Lionurus. See Plate of Codfish and Allies.

GRENADIER GUARDS. Certain regiments of foot guards in European armies. In England the regiment of Grenadier Guards consists of the

first, second, and third battalions, and takes seniority of all other infantry regiments, whether of guard or line. It was organized in 1660 under the title of the First Foot Guards. See GRENADE; GRENADIER.

GRENADIERS, THE (Ger. *Die Grenadiere*). A famous poem by Heine, celebrating the devotion of Napoleon's soldiers. It is the conversation of two grenadiers returning to France after the disastrous Russian campaign of 1812. It has been set to music by Schumann.

GRENADINES, grĕn'ä-dēnz'. A chain of islets belonging to the Windward group of the West Indies, situated between Grenada and Saint Vincent (Map: West Indies, R 8). They number about thirty and cover an area of 18 square miles. The population was 6497 in 1901, of whom the larger part was found on the chief island of Carriacou, an administrative dependency of Grenada. The rest of the group belong to Saint Vincent.

GRENELLE, gre-nĕl'. A southwestern quarter of Paris, and an important junction on the Circular Railway, with branches to the Champs de Mars and to Les Moulineaux. The embankment commands a splendid view of the city. Grenelle is famous for its artesian well.

GREN'FELL, FRANCIS WALLACE, Baron HELVEY (1841—). An English soldier, born in London. He entered the army (Sixtieth Rifles) in 1859; was commissioned captain in 1871 and major in 1878, during which year he served in the Kaffir War as deputy assistant adjutant and quartermaster-general at headquarters. In the Zulu War of 1879 he was deputy assistant adjutant-general at headquarters, and also took part in the action at Ulundi. In the Boer War of 1881 he was assistant quartermaster-general under the command of Sir Evelyn Wood. During the Egyptian War of 1882 he was assistant adjutant and quartermaster-general on the headquarters staff, and fought at Tel-el-Kebir; in 1884 accompanied the Nile Expedition; was Sirdar of the Egyptian Army from 1885 to 1892; directed the operations near Suakim in 1888; and commanded the British and Egyptian troops at Toski (1889). He was appointed deputy adjutant-general for militia, yeomanry, and volunteers in 1892; from 1894 to 1897 was at the War Office as inspector-general of auxiliary forces; and in 1897-98 commanded in Egypt. He became Governor-General and Commander-in-Chief of Malta in 1899. By successive promotions he attained the rank of lieutenant-general.

GRENFELL, GEORGE (1849—). An English missionary and explorer, born in Lancreed, Cornwall. In 1874 he went as a Baptist missionary to Kamerun in Equatorial West Africa, established the Victoria station at the foot of the Kamerun Mountains, and explored the surrounding country in company with Comber. His later investigations of the Congo Basin greatly modified the views held on the hydrography of that region. He explored the Ubangi (Mobangi) River, the greatest tributary of the Congo, in 1885. He also explored the Mongalla and Aruwimi rivers, which flow into the Congo from the north, and the southern tributaries, Chuapa, Lulongo, and Lomami. He rendered an important service in 1891-92 as a delegate of the Congo Free State in negotiating a boundary line with Angola, on the Kuangu River.

GRENOBLE, gre-nō'bl' (Lat. *Gratianopolis*, City of Gratian). The capital of the Department of Isère, France, and a fortress of the first class, on the Isère, 81 miles from Lyons by rail (Map: France, M 6). It is surrounded by high mountains and divided by the river, which is here confined within handsome quays, into two unequal portions: the ancient quarter on the right bank is small and uninteresting, while the modern portion on the opposite bank has a number of fine streets and squares. Among the chief public buildings are the Palais de Justice, in Renaissance style, built in the fifteenth century; the cathedral, dating from the eleventh, twelfth, and sixteenth centuries; and the museum with an extensive gallery of ancient and modern paintings and a library of over 170,000 volumes and 7000 manuscripts. The University of Grenoble, founded in 1339, has three faculties and over 500 students; there are also a theological seminary and military and art schools. The chief industrial products are gloves, leather, silk, liquors, and cement. Population, in 1901, 59,474. Grenoble, originally the Cularo of the Allobroges, was fortified by Gratian in the fourth century, and became Burgundian in the following century. Later it was the capital of Dauphiné until 1453.

GREN'VILLE, GEORGE (1712-70). An English statesman, brother of Richard Grenville, Lord Temple, and brother-in-law of the Earl of Chatham. Educated at Eton and Christ Church College, Oxford, and admitted to the bar in 1735, he abandoned the law to enter Parliament in 1741, and from 1744 to 1762 filled various Government offices. In 1757 he secured the passage of a bill for the regulation of the payment of the navy. Five years later he became Secretary of State for the Northern Department, and in the following year succeeded Lord Bute as Prime Minister, uniting in himself the offices of Chancellor of the Exchequer and First Lord of the Treasury. He is best known from his connection with the Stamp Act and the famous Wilkes case. He advocated the passage of the Stamp Act, and opposed its repeal. He favored the prosecution of Wilkes, but later opposed his expulsion from the House of Commons. He was forced in 1765 to resign the Premiership, and died five years thereafter without again holding important office. Grenville was distinguished for eloquence, public spirit, business qualities, and extensive knowledge; but his imperious nature made him an unpopular Minister, alike with the King, the Parliament, and the people. For an account of his life, consult: *The Grenville Papers* (London, 1852-53); Chatham, *Correspondence* (London, 1838-40); Walpole, *Memoirs of the Reign of George II.* (London, 1847); Walpole, *Memoirs of the Reign of George III.* (London, 1859); also Lecky, *History of England*, ii., 458 f. (New York, 1891); Macaulay, *Essays* (New York, 1860).

GRENVILLE, GEORGE, Viscount LANSDOWNE. See GRANVILLE.

GRENVILLE, or **GREYNVILE,** Sir RICHARD (?1541-91). An English naval officer. As a young man he served with distinction against the Turks, under the Emperor Maximilian II. Upon returning to England he became interested in the exploration of the New World, and in 1585 commanded a fleet of seven ships, which, under the patronage of his cousin, Sir Walter Ralegh, sailed to found a colony in Virginia. The fol-

lowing year he returned to Virginia, bringing supplies for the colonists at Roanoke, but found the settlement abandoned, the people having returned to England with Sir Francis Drake. During the homeward trip he landed at the Azores, where he pillaged towns and carried off prisoners. In 1591, as second in command, on the *Revenge*, he accompanied Lord Thomas Howard to the Azores to intercept the treasure fleet of Spain. The English were surprised by a powerful Spanish armada, and for some cause not perfectly clear the *Revenge* was delayed until the Spaniards got to windward of her, and cut her off from the rest of the squadron. Grenville attempted to break through the Spanish line, and was overpowered and captured, after fifteen hours of desperate fighting with one hundred and fifty men against five thousand. Grenville was mortally wounded, and died three days afterwards. Consult Arber, "Last Fight of the *Revenge* at Sea," in *English Reprints*, vol. xiv. (London, 1871). The narratives of Grenville's voyages are in Hakluyt, *Voyages*, vols. ii. and iii. (London, (1809-12; Edinburgh, 1889-90).

GRENVILLE, Richard Temple. See Temple, Earl.

GRENVILLE, William Wyndham, Lord Grenville (1759-1834). An English statesman, the youngest son of George Grenville (q.v.). He was born on October 25, 1759. After studying at Eton and Oxford with brilliant success, he underwent a law course at Lincoln's Inn, but did not enter the profession. He became a member of the House of Commons in 1782, and attended his eldest brother, Lord Lieutenant of Ireland, in the character of secretary. Soon after he became Paymaster-General of the army, and in 1789 was chosen Speaker of the House of Commons. In 1790 he was appointed Secretary of State for the Home Department, and was raised to the peerage with the title of Baron Grenville. He became Foreign Secretary in the ensuing year. He resigned office, along with Pitt, in 1801, on the refusal of George III. to give his assent to the Catholic Emancipation Bill. He was Premier of the 'All the Talents Ministry' (q.v.) in 1806-07, the chief act of which was the abolition of the slave trade. In 1809 he was chosen chancellor of the University of Oxford. From 1815 he acted along with Earl Grey, and generally supported Mr. Canning. He died at Dropmore, Buckinghamshire, January 12, 1834.

GRESH'AM, Sir Thomas (1519-79). An English merchant and financier. He was educated at Gonville Hall, Cambridge, was apprenticed to his uncle, Sir John Gresham, merchant, and was admitted to membership in the Mercers Company (1543). In 1551 he became King's factor at Antwerp, in which office it was his business to negotiate royal loans with Flemish merchants, to buy arms and military stores, and to divert to England as much bullion as possible. As a result of his skillful management of the finances, the rate of exchange, which had been very unfavorable to England, was much improved. Since he was a Protestant, he was dismissed upon Mary's accession to the throne; but he had proved himself indispensable, and was quickly reinstated. Elizabeth's successful financial policy owed much to his shrewd advice. At his suggestion the debased currency was restored, and later, when the troubles in Antwerp curtailed foreign resources, he persuaded her to secure a forced loan from the merchant adventurers and staplers, by the detention of their fleets. In 1554 he was sent to Spain to procure bullion, and in 1559 he was employed as Ambassador to the Duchess of Parma, Regent of the Netherlands. On this occasion he was knighted. He also carried on an extensive private business as banker, goldsmith, and mercer, and was held to be the wealthiest merchant of his time. He possessed much landed property, and established the earliest paper-mills in England. He applied his wealth to public uses, after the death of his only son, in 1564. He founded a bourse in London, in imitation of the one at Antwerp, and named it the Royal Exchange. He also founded Gresham College and eight almshouses. Consult Burgon, *Life and Times of Sir Thomas Gresham* (London, 1839). See Gresham's Law.

GRESHAM, Walter Quinton (1832-95). An American jurist and politician, born near Lanesville, Harrison County, Ind. He was educated at the Indiana State University, but left before completing the course, and, after studying law at Corydon, Ind., was admitted to the bar in 1853. He stumped the State of Indiana for Frémont in the campaign of 1856, and in 1860 was elected as a Republican to the State Legislature. In 1861 he enlisted as a private in the Thirty-eighth Indiana Volunteers, but was chosen lieutenant-colonel of the regiment before it left the State. In December, 1861, he was commissioned colonel of the Fifty-third Indiana Volunteers, and commanded it at Shiloh, at Corinth, and in the Vicksburg campaign. For bravery at the siege of Vicksburg he was promoted to be brigadier-general in August, 1863. He commanded the Fourth Division of the Seventeenth Army Corps of Sherman's army at the beginning of the march to the sea; but at Leggett's Hill, near Atlanta, was so severely wounded in the knee as to be compelled to retire from active service. In March, 1865, he was brevetted major-general. After the war he resumed his law practice at New Albany, Ind., and in 1866 was an unsuccessful Republican candidate for Congress. After spending the greater part of the next two years in New York City as financial agent for his native State, he was appointed in 1869 by President Grant United States District Judge for Indiana. In 1880 he was an unsuccessful candidate for the United States Senate, and in 1882 resigned his seat on the bench in order to accept President Arthur's tender of the office of Postmaster-General, made vacant by the death of Timothy O. Howe. In 1884 he was made Secretary of the Treasury, a position which he held for a few months, when he was appointed United States Circuit Judge for the Seventh Judicial Circuit. He was a candidate for the Republican nomination for President in 1884 and 1888. Later his views on the tariff underwent a change, and he found himself out of sympathy with his party. Several of his judicial decisions had won for him the support of the Populists, and had he consented he could have been nominated for the Presidency at the national convention of that party held at Omaha, Neb., in July, 1892. He refused to allow his name to be considered, however, and soon after issued a public statement declaring his purpose to support Grover Cleveland's candidacy. After his election, President Cleveland named Judge Gresham Secretary of State.

GRESHAM'S LAW. A principle of political economy formulated by Sir Thomas Gresham (q.v.) to the effect that in a monetary circulation bad money drives out good. It was originally applied to the effect upon the circulation of mutilated, worn, or depreciated coinage. If into such a coinage new, full-weight coins be injected, it will not be long before the latter are exported or find their way to the melting-pot, while the worn-out coins still continue to fulfill their function as money. The reason for this lies in the higher bullion value of the new coin. For exportation or industrial uses the value of the coin is determined by the weight. It is therefore the best coins which are sought for this purpose, and it is a familiar experience that the export of coin works towards the deterioration of the coinage. In latter days Gresham's law has been applied to concurrent circulation of different types of money—gold, silver, and paper. Under the joint circulation of gold and silver, that which in the currency of the country is the cheapest as compared with the valuations of other countries, and the world's market, will tend to displace the other metal. In like manner the infusion into the circulation of irredeemable paper money promotes exportation of metallic money. Gresham's law, in the familiar form that bad money drives out good, of course applies absolutely only where there is a redundancy of currency. In such a case there is a natural movement toward the exportation of money, and that metal will be chosen for exportation which is of least value at home. Unless such redundancy exists, gold and silver may and do circulate side by side despite the fact that legal ratios do not conform to the general market, or, in other words, that in the sense of the maxim one is good and the other bad. Consult: Gide, *Political Economy* (Paris, 1884); Walker, *Political Economy* (New York, 1886); also Daniel, "The Confirmation of Gresham's Law," in *Annals of the American Academy of Political and Social Science*, vol. vi. (Philadelphia, 1895).

GRESSET, grĕs'sā', Jean Baptiste Louis (1709-77). A French poet and playwright, born at Amiens. At sixteen he became a Jesuit, and later taught in Jesuit colleges. *Vert-Vert*, the delightful tale of an indiscreet parrot, appeared at Rouen in 1734, and soon went the rounds of Europe. His *Chartreuse*, *Carême impromptu*, *Lutrin vivant* soon afterwards dismayed the Jesuits. Gresset was sent off to La Flèche and shut out of the Company. In 1740 he was in Paris, and there he had played his *Edouard III.*, a tragedy, a comedy called *Sydney* (1745), and *Le Méchant* (1747), which was then a success. Famous in Paris, where he became an Academician in 1748, Gresset went to Amiens, and founded an academy in 1750. In 1759 we find him forswearing the theatre, even indulging in a little severity to placate his brethren whom he had scandalized by his satire on selfish Court prelates. Gresset's works appeared in three volumes in 1811, and again in 1859. *Vert-Vert* and other pieces were Englished by 'an officer of the army' (New York, 1801) in the *Select Translations and Imitations from the French of Marmontel and Gresset*. Consult, also: Dérome, *Poésies choisies*, with bibliography and biography (Paris, 1883); Daire, *Vie de Gresset* (ib., 1779); Robespierre, *Eloge de Gresset* (London, 1785); Bailly, *Eloge de Gresset* (Geneva, 1785); Cayrol, *Essai historique sur la vie et les ouvrages de Gresset* (Amiens, 1845); Saint-Albin Berville, *Gresset, sa vie et ses œuvres* (ib., 1863).

GRETA (grē'tà) **HALL.** The residence of the poet Southey from 1803 to his death. It is situated in the Vale of Keswick, Cumberland, and consists of two houses under a single roof. One of these Coleridge had occupied from three years previous to Southey's coming. Southey bought the whole in 1809, but Coleridge's wife and children were permitted to continue to reside in their wing.

GRETCH, grĕch, Nikolai Ivanovitch (1787-1867). A Russian author, born in Saint Petersburg, of a Bohemian family. He studied law, but later devoted himself to literature. From 1809 to 1813 he was professor of Russian literature in the German school at Saint Petersburg, and for three years more in a Russian gymnasium. He traveled in Germany and France, and in 1829 became connected with the Ministry of the Interior. Transferred to the Department of Finance, he traveled in England, France, and Germany, studying the subject there. His rapid political advancement was due to his conservative politics as set forth in the *Syn Otechestva* (1812-38), and in the *Sĕvernaja Pĕela* (1825-60), which he edited with Bulgarin in such a way as greatly to affect Russian politics and literature, especially between 1830 and 1840. But his books are better known than his political or journalistic work. He wrote a handbook of Russian literature (1819-22), a work on Russian grammar (2d ed. 1830), two novels, two books of travel, and posthumous memoirs (1886). His complete works were published at Saint Petersburg in 1855, in three volumes. Gretch's sketch of Russian literature, translated into German, is contained in Otto, *Lehrbuch der russischen Litteratur* (Leipzig and Berlin, 1837).

GRETCHEN. The heroine of Goethe's *Faust*, a simple, confiding girl of the people, who gives her love to the title character, but is corrupted by him. She kills her child, and is condemned to death for her act, but while in prison dies insane. Gretchen is one of the most striking female characters in dramatic literature, an ideal picture of innocence and devotion.

GRETHEL, grā'tel, Gammer. The fictitious personage by whom the famous fairy tales of the brothers Grimm are supposed to be told.

GRET'NA. A parish-seat of Jefferson Parish, La., on the Mississippi River, opposite New Orleans, with which it is connected by ferry, and on the Southern Pacific and other railroads (Map: Louisiana, E 4). It is engaged extensively in the manufacture of cottonseed oil. Gretna was founded in 1835, and on several occasions, particularly in 1880 and 1891, suffered from breaks in the levee. Population, in 1890, 3332; in 1900, not given in census.

GRETNA GREEN. A village of Dumfriesshire, Scotland (near the Solway, and just over the border from England), which gained great notoriety during the last century as the favorite place for runaway couples from England to celebrate marriages and so easily evade the English Marriage Act, which required the consent of parents and guardians, publication of banns,

and the presence of a priest. The law of Scotland required nothing but a mutual declaration of intention to be exchanged in presence of witnesses—a ceremony which could be performed instantly; and it was immaterial whether the parties were minors or not. This declaration generally took place in presence of a blacksmith, who in reality was no more necessary than any other witness, but who gradually assumed an authority which imposed on the credulity of the English strangers, and profited by the liberality usually dispensed on such auspicious occasions for his trifling services. The declaration of marriage being exchanged, the parties could return at once to England, and their marriage was held valid there and the world over, under the rule of law that the validity of a marriage is governed by the law of the place where it is contracted (*lex loci contractus*). The severity of the English marriage law has been modified; the Scotch law has been altered, with a view of checking this evasion of English law; and by 19 and 20 Vict., ch. 96, no irregular marriage of that kind in Scotland is now valid unless one of the parties had at the date thereof his or her usual place of residence there, or had lived in Scotland for twenty-one days next preceding such marriage. See MARRIAGE.

GRÉTRY, grā'trē', ANDRÉ ERNEST MODESTE (1741-1813). A once celebrated French dramatic composer, born at Liège. His earliest musical experience was as a chorister in a local church, but, as it proved unsatisfactory, he was placed under private teachers. About this time he first heard an operatic performance, which strongly incited him to the study of harmony and counterpoint on his own account. He was, however, a poor student, and so impatient to create that at seventeen years of age he had produced six symphonies, and in 1759 wrote a mass which so interested an influential Church dignitary as to gain for its composer the means to study in Rome, where for five years he studied at the Collège de Liège. Here the same characteristics that had previously marred his educational progress prevented any real advancement in the broader field of musical art, and, following his own inclinations, he turned toward dramatic music, his first venture, an intermezzo, *Le vendemmiatrice* (1765), being well received. After staying in Rome nine years, he went to Geneva on a fruitless mission to secure a libretto from Voltaire. Acting on the latter's advice, he made his way to Paris, where, after two years of hardship, he succeeded in obtaining the patronage of Count Creutz, the Swedish Minister, who secured him Marmontel's *Le Huron* (1768), for which he wrote the music, and through which he rose to fame. Nearly everything he wrote subsequently was enthusiastically received, notwithstanding a great many musical defects, and the overshadowing of his work by the greater genius of Méhul and Cherubini. Elleviou, the great tenor, did much to revive an interest in Grétry, the composer's glowing melodies and strong dramatic expression giving a chance for the display of his magnificent voice. Eventually, the progress of the public taste in music caused his works to be neglected, and ultimately almost forgotten. He wrote about fifty operas and much dramatic music, piano sonatas, instrumental numbers, masses, and Church music generally, most of which were published, and enjoyed more or less popularity. He had but a superficial knowledge of the theory of music and the science of harmony. Breitkopf and Härtel commenced in 1883 a complete edition of his works. Consult: A. J. Grétry, *Grétry en famille* (Paris, 1815); Brunet, *Notice biographique sur Grétry* (Paris, 1884).

GREUZE, grēz, JEAN BAPTISTE (1725-1805). A French genre painter. He was born at Tournus, in Burgundy, August 21, 1725. His talent was recognized and encouraged by the Lyonnese painter Grondon, who taught him and took him to Paris. There Greuze studied in the schools of the Academy, and attracted attention by his first picture, "A Father Explaining the Bible to His Children." His succeeding works placed him at the head of the French genre painters of the day. Moved by the taunts of the Classicists, he went to Rome in 1755, but his visit exercised little influence upon his art. He sent an unfortunate historical painting, "Severus and Caracalla," for admission to the Academy, and was admitted, but expressly as a genre painter. He returned in anger, and did not exhibit until after the Revolution, in 1804. In the meantime he had lost his wealth, and he died in poverty in Paris, March 21, 1805.

Greuze's art represented a reaction from the artificial art of the Rococo. He succeeded especially well with young girls. His manner was somewhat affected, but he was a fine colorist, and executed his works with great finish. His portraits of women and children are very beautiful, but he was not always successful in portraying the best expression of his sitters. A follower of Watteau, his work is charmingly picturesque, although too sentimental to be altogether pleasing.

The Louvre contains a number of his chief works: the "Village Marriage," the "Father's Curse," the "Son Punished," the "Broken Pitcher," besides portraits of the artist and other persons. Other works are in nearly all the chief galleries of France, Germany, and Great Britain, among which the "Girl with an Apple," National Gallery, London; "Girl with a Music Book," Berlin; and a "Man with the Gout," at Dresden, are particularly well known. Consult Normand, *Jean Baptiste Greuze* (Paris, 1892).

GRÈVE, grâv, PLACE DE LA. The former name of the present Place de l'Hôtel de Ville at Paris, so called from its position on the river bank. It was a favorite gathering place of unemployed laborers, and the scene of the chief popular festivities. In it many famous criminals and political offenders have been executed, among them Ravaillac, the murderer of Henry IV., the Marquise de Brinvilliers, the highwayman Cartouche, and Damiens, the would-be assassin of Louis XV. The place received its present name in 1806.

GREV'ILLE. In Richardson's *Sir Charles Grandison*, the tiresome, persistent, and immensely self-satisfied suitor of Harriet Byron.

GREVILLE, CHARLES CAVENDISH FULKE (1794-1865). An English diarist. He prepared for college at Eton, entered Christ Church College, Oxford, but left without a degree to become the private secretary of Lord Bathurst. Later he was appointed to the secretaryship of Jamaica—a sinecure position, as he never visited the island. At the age of twenty-seven he became clerk

GREUZE

"THE BROKEN PITCHER," FROM THE PAINTING IN THE LOUVRE, PARIS

of the council, a position he held till 1859, and by means of it became conversant with the plans and purposes, as well as with the men themselves, of every Ministry of these forty years. As he was keen, honest, and unbiased, and possessed of a vigorous and interesting style, he was qualified to record the events and life around him. He improved his opportunity by keeping a political diary or journal for a large portion of his life. These memoirs were placed in the hands of his friend, Mr. Henry Reeve, with the injunction to have them published at a not too distant date after his death. Acting on this request, the diary for the reigns of George IV. and William IV., 1820-37, was published in 1875, in three volumes. Later, other volumes, covering the years from the accession of Queen Victoria to 1860, were issued. The memoirs afford a valuable insight into the private views and motives of the leaders of English political life. Greville records not so much public events as the private causes which led to them; and perhaps no English memoir-writer has left behind him a more valuable contribution to the history of last century. Greville published anonymously, in 1845, a volume on the policy of England toward Ireland, in which he advocated the payment of the Roman Catholic clergy; he was also the author of several pamphlets on the events of his day.

A biographical notice by Henry Reeve may be found in the preface to his edition of the *Greville Memoirs* (London, 1875); see also the *English Historical Review*, January, 1886, and April, 1887. His works have been collected and edited under the title, *Greville Memoirs: Journal of the Reigns of George IV., William IV., and Queen Victoria* (8 vols., London, 1896).

GREVILLE, Sir Fulke, first Lord Brooke (1554-1628). An English poet and courtier, born at Beauchamp Court, Warwickshire. He entered Shrewsbury School in 1564 on the same day with Sir Philip Sidney, and an intimacy grew up which remained unbroken until Sidney's death. Though he matriculated at Jesus College, Cambridge (1568), while Sidney went to Oxford, the two kept in constant communication, and in 1577 they went together to the Court of Queen Elizabeth, where Greville at once found great favor. He made several visits to the Continent, where he met many men of distinction. He saw some service in Normandy under Henry IV. about 1591, was four times a member of Parliament between 1592 to 1620; became Treasurer of the Navy in 1598, and in 1603 was confirmed for life as Secretary for Wales, to which position he had originally been appointed in 1583. On the accession of James I. Greville was made a Knight of the Bath. From 1614 to 1621 he was Chancellor of the Exchequer. He was made Baron Brooke in 1621, but his political activity as a peer was limited to service in the council of War in 1624 and membership in a few committees. He was stabbed by an old servant, one of the witnesses of his will, to whom he had not left a legacy, and died September 30, 1628. Of Lord Brooke's literary work little appeared during his lifetime except a few scattered poems and *The Tragedie of Mustapha* (1609), the text of which was subsequently altered. The bulk of his poetical work was published in 1633, a single folio containing *A Treatie of Humane Learning; An Inquisition Upon Fame and Honour;* and *A Treatie of Warres*, together with an improved text of *The Tragedie of Mustapha; The Tragedie of Alaham;* and *Cœlica*, the last a collection of so-called 'sonnets,' which, however, were not written in the sonnet form. His longest work, *The Life of the Renowned Sir Philip Sidney*, in prose, which was as much autobiography as biography, with interesting and original views on politics, appeared in 1652. All of his metrical writings, save his 'sonnets,' were written in a close, subtle style, and his subjects were not well adapted to poetic expression; and all tendencies toward fanciful grace are lost in the philosophy and argumentativeness that characterize his versified tracts. His extant works, in four volumes, were reprinted in the "Fuller Worthies Library," edited by Grosart (1870).

GRÉVILLE, grā'vēl', Henry (1842-1902). Pseudonym of Alice Marie Céleste Durand. A French novelist and very popular purveyor of emotional sensationalism. She was born in Paris. Of her many volumes, those of Russian life are best. Of these *Sonia* (1877) and *Dosia* (1876), both reprinted in America, are sufficiently typical. Her literary career began in Russia with stories and sketches contributed to the *Journal de Pétersbourg* (1868-72), but when her husband lost his professorship in the law school there she returned to Paris. In 1886 she lectured in the United States on French and Russian literature, and embodied parts of her experience in *Frankley* (1887), a mediocre novel. She wrote also dramas, and several times revisited America.

GREVILLEA (Neo-Lat., named in honor of the English botanist Robert Kaye Greville). A genus of about 150 species of Australian trees and shrubs, which belong to the natural order Proteaceæ. Some species are of considerable economic importance. One of the most common and important is the silk-oak (*Grevillea robusta*), a tree of rapid growth, which attains a height of 150 feet or more. Since it resists drought remarkably, it is of value for desert cultivation. The wood is elastic and durable, and is especially valued for barrel-staves. In every country where this tree has been introduced it is highly esteemed. It is hardy in California, where it is valued as a shade-tree in the vicinity of San Francisco. It is easily grown from seed to some extent in hothouses on account of its graceful fern-like foliage. For decorative purposes it is used only while young. The timber of *Grevillea linearis* is harder and closer-grained, and since it takes a good polish, is extensively used for furniture, cabinet, and fancy work.

GRÉVY, grā'vē', Albert (1824-99). A French statesman, born at Mont-sous-Vaudrey (Jura), the brother of Jules Grévy, President of France. He studied law and became president of the Corporation of Barristers at Besançon. In 1871 he represented the Department of Doubs in the National Assembly, was vice-president of the Chamber, was civil and military Governor of Algeria (1879), and was elected Life Senator in 1881.

GRÉVY, Jules (1807-91). A President of the French Republic. He was born August 15, 1807, at Mont-sous-Vaudrey (Jura), of an old and respected family. After receiving a good classical education, Grévy came to Paris to study law. While still a student he took part in the

Revolution of 1830, and being later admitted to the bar (1837), he showed his republican sympathies by acting for political prisoners before the Paris tribunals, notably in 1839, in the case of two republican friends of Barbès (q.v.). In 1848 Grévy was appointed by the Provisional Government commissioner-general in the Jura district, and was returned as Deputy to the Constituent Assembly. In this capacity he was an independent, and generally voted with the extreme Left. After Louis Napoleon's coup d'état, Grévy withdrew from politics and devoted himself to his professional work. He rose to great eminence in his profession, and was elected *bâtonnier* or president of the Paris bar. He returned to politics in 1868 as a Deputy to the Corps Législatif from the Jura Department, and acted as a moderate Republican. After the Franco-German War he was elected to the National Assembly at Bordeaux, and was chosen its president, a post he resigned in 1873. He reëntered the Chamber in the general election of 1876, and became its president. When Marshal MacMahon resigned the Presidency of the Republic in 1879, Grévy was elected his successor, January 30th, and he was reëlected in 1885. During his first term of office Grévy was distinguished by the moderation of his views, his sagacity, and unostentatious mode of life. His tact and diplomatic ability smoothed over many difficulties in the problems of the day. His second term of office was less successful. His popularity was entirely destroyed by the revelations of a scandalous trade in offices and decorations of honor carried on by his son-in-law, Wilson, and he was forced to resign, December 2, 1887. He died at Mont-sous-Vaudrey September 9, 1891. In 1873 Grévy published a pamphlet, *Le gouvernement nécessaire*, in which he pleads for the strengthening of the Republic. His *Discours politiques et judiciaires, rapports et messages*, were edited with an introduction by Delabrousse (1888). Consult also Bertrand, *Le président Grévy* (Besançon, 1892). For short biographies in English, see King, *French Political Leaders* (New York, 1882); and "Biographies of Eminent Persons," reprinted from the London *Times* (London, 1896).

GREW, Nehemiah (1641-1712). An English physician and botanist, born in the parish of Mancetter, and educated at Cambridge and at Leyden. In 1677 he was appointed secretary of the Royal Society, and he held this position for several years. He was the first to write upon the anatomy and physiology of plants, although his priority in this field was for a time doubtful owing to the researches of Marcello Malpighi. His works include: *The Anatomy of Vegetables Begun, with a General Account of Vegetation Grounded Thereon* (1672); *The Comparative Anatomy of Trunks* (1675); *A Discourse of the Colors of Plants* (1677); and *Cosmologia Sacra, or a Discourse of the Universe* (1701).

GREWIA, grōō'i-à (Neo-Lat., named in honor of Nehemiah Grew). A genus of trees which belong to the natural order Tiliaceæ. Its members have simple and more or less ovate leaves, and a drupaceous fruit. They are African, Australian, and Asiatic, mostly tropical or subtropical. Some species, as *Grewia sapida* and *Grewia Asiatica*, natives of the warmer parts of India, yield pleasant fruits, much used in the manufacture of sherbet. By the inhabitants of the Himalayas the inner bark or bast of *Grewia oppositifolia*, like that of the lime-tree in Europe, is used for cordage; and the leaves of *Grewia lævigata* and other species are given as fodder to cattle, and dried and stacked for winter use. The wood of this species is used for boats. That of *Grewia Asiatica* is much valued where strength and elasticity are required, as for making bows and the shafts of carriages. The Australian species, *Grewia polygama*, and the Meluccan *Grewia latifolia*, yield, respectively, a fruit used to make a pleasant beverage, and a hard, close-grained wood that takes a high polish. The trees do not attain sufficient size to be very valuable. One or two species have been introduced in horticultural grounds in Florida and California. The bast fibre of a number of species is used for rope-making, and some would doubtless prove valuable in paper-making.

GREY, Charles, first Earl Grey (1729-1807). A British officer, born at Howick, England. He was made an ensign in the English Army in 1748, and until 1776 accompanied his regiment upon various expeditions, serving as aide-de-camp to Ferdinand of Brunswick during the Seven Years' War, and receiving wounds at Minden and Campen. In 1776 he came to America with Howe's forces, and was promoted to the local rank of major-general two years later. He conducted his military movements with energy and skill, and he succeeded in defeating Gen. Anthony Wayne at Paoli, and Baylor's corps of Virginia Dragoons at Tappan. He also commanded a brigade at the battle of Germantown. Upon his return home in 1782, Grey was made lieutenant-general, and the command of the entire British Army in America was given him; but the war came to an end before he could resume his military duties. In 1793 he had joint command with Jervis of the expedition sent to put down the revolt in the West Indies, and in 1798-99 he commanded the counties of Kent, Sussex, and Surrey. He was made Baron Grey of Howick in 1801, and in 1806 his title was advanced to Viscount Howick and Earl Grey.

GREY, Charles, second Earl Grey (1764-1845). An English statesman, born at Falladon, Northumberland, of an ancient family, and educated at Eton and King's College, Cambridge. After traveling on the Continent, he became, in his twenty-second year, a member of Parliament for his native county. Abandoning the politics of his family, he became a follower of Fox, making his maiden speech in opposition to the address of thanks to the King for negotiating the commercial treaty with France. He soon obtained a leading position in the House of Commons, and was one of the managers of the impeachment of Warren Hastings. A prominent member of the Society of Friends of the People, in 1793 he was solicited to present a petition from this society in which the defects and abuses of the 'rotten borough' system were forcibly exposed. On a motion for reform he was outvoted on this occasion, and again in 1797. In 1799 he opposed the proposal for the Irish union, but recommended the abolition of forty rotten boroughs in Ireland as a means of securing the independence of Irish members. When the Whig Administration of Lord Grenville came into office in 1806, Grey, now Lord Howick, became First Lord of the Admiralty.

Fox died in September, and was succeeded by Grey as Secretary of State for Foreign Affairs and leader of the House of Commons. The Cabinet was broken up in 1807, but not before it had carried the abolition of the slave trade and the enlistment of soldiers for a limited period instead of for life. By the decease of his father in 1807 he was removed from the House of Commons to the Upper House. Grey and Lord Grenville, as the leaders of the Whig opposition, were more than once desired by the Prince of Wales, after he had become regent, to coalesce with the Tory Ministry, but their overtures were firmly rejected. Grey actively opposed the bill of pains and penalties against Queen Caroline. During the long period in which he remained in opposition, from 1807 to 1830, he gave a strenuous support to the abolition of religious tests, the removal of Roman Catholic disabilities, and the amelioration of the criminal code. When Parliament met in November, 1830, he again urged the adoption of measures of temperate reform. In answer to this the Duke of Wellington declared against any reform, and affirmed his devoted allegiance to existing conditions; a position which caused the overthrow of his Administration, put the Whigs in power, and permitted them to fix the character and extent of reform.

Grey now became Prime Minister, and March 1, 1831, his Ministry presented a bill, prepared by a sub-committee of the Cabinet led by Lord John Russell (q.v.), which provided for moderate yet extensive changes: (1) in the distribution of seats in the Commons (disfranchising many 'rotten boroughs' and increasing the representation of the northern cities and boroughs); (2) in extending and simplifying the suffrage; and (3) in equalizing conditions in many other ways. The bill was fiercely opposed, and upon the motion of General Gascoyne amended, an act which caused Grey to advise William IV. to dissolve Parliament and appeal to the people. When the new Parliament met, the bill was carried through the Lower House by large majorities. The second reading was moved by Grey in the House of Lords, October 3, 1831. After five nights the bill was thrown out by 199 votes against 158. The reply of the House of Commons was an immediate vote of confidence in the Ministers. The King prorogued Parliament in order that after the shortest possible interval the bill might be again introduced. Riots took place at Nottingham, Derby, and Bristol. At Birmingham a large mob threatened to march upon London. A second reform bill passed the House of Commons, which also passed a second reading in the House of Lords, the Tories being determined to mutilate it in committee. Lord Lyndhurst moved the postponement of the disfranchising clauses, and, the Whigs being beaten, Grey resorted to the extreme remedy of demanding from the King a new and large creation of peers. Consent to this was refused, and Grey resigned. The King thereupon sent for the Duke of Wellington, but, Sir Robert Peel refusing to join the Duke in the attempt to form a Government, Grey again returned to office, armed with the written authority of the King to create as many peers as might be necessary to secure the safety of the bill, and on June 4, 1832, the Reform Bill passed the House of Lords.

Grey took office on the principles of peace, retrenchment, and reform. His Government, however, lost a good deal of its popularity in England by his deference to the Lords, and his attempts to conciliate his opponents by a division of patronage. In Ireland, Stanley's quarrels with O'Connell and the Irish repealers also tended to weaken the Government. Many important measures were, however, passed—as the measure for national education in Ireland, the Irish Church Temporalities Bill, and the bill for abolishing slavery in the West Indies. In December, 1834, the Grey Ministry fell to pieces on the Irish Coercion Act. Grey retired from the post of First Lord of the Treasury with the respect and esteem of the entire nation. He passed the last ten years of his life in comparative retirement, and died at his family mansion, Howick House, July 17, 1845. For the life of Grey, consult: Lord Holland, *Memoirs of the Whig Party* (London, 1842-54); Roebuck, *History of the Whig Ministry* (London, 1890). For his letters and correspondence, see Strange, *Correspondence of Princess Lieven and Earl Grey, 1824-34* (London, 1890), and *The Correspondence of William IV. and Earl Grey* (London, 1867). Some valuable material may also be found in Molesworth, *History of England, 1830-74* (London, 1874).

GREY, Sir George (1812-98). A British colonial governor and author, in his later years popularly known as 'the veteran colonial administrator,' and 'the founder of the British South African Empire.' The son of Lieutenant-Colonel Grey, who fell at Badajos, he was born at Lisburn, Ireland, in 1812. He was educated at Sandhurst Military College, and on attaining his captaincy he received an official commission, on application, to explore interior Australia. He started on his journey in 1837, and the following year organized another expedition to explore the Swan River District. The results were embodied in two books published on his return to England in 1840. His enterprise and ability obtained for him, unasked, in 1841, the post of Governor of South Australia. In 1846 he was made Governor of New Zealand. Both here and in Australia his first task was to acquire the language of the natives, with whom he became very popular. His government was so wise and conciliatory that in 1848 he was made K.C.B. (civil), and in 1854 was appointed Governor of Cape Colony. The task of allaying the irritation left by the Kaffir War demanded high powers of statesmanship, and Grey was equal to the occasion. In 1858, however, the Colonial Office interfering with measures which he considered necessary, he threw up his post and came to England. Public opinion at the Cape was so strongly manifested in his favor that he was requested by the Government to resume his Governorship. On the breaking out of the Indian Mutiny Grey sent every soldier he could spare to the assistance of the Indian Government. In 1861 he was again appointed Governor of New Zealand, in the hope that he would bring the war then raging there to a satisfactory conclusion, and he succeeded in bringing about pacific relations with the Maoris. He resigned his office and returned to England in 1867; but afterwards resided in New Zealand, and from 1877 to 1891 was Premier of the colony. He revisited England in 1894, and resigned his seat in the New Zealand Parliament in 1895. He died in London, September 19, 1898. Grey was the author of: *Journals of Discovery in Aus-*

tralia (1841); *Polynesian Mythology* (1855); and *Proverbial Sayings of the Ancestors of the New Zealand Race* (1858).

GREY, Sir Henry George, third Earl Grey (1802-94). An English politician, eldest son of Charles Grey, second Earl Grey. He was born at Howick, Northumberland, and was educated at Trinity College, Cambridge. He held the title of Viscount Howick from 1807. His long Parliamentary career began in 1826, with his election to the House of Commons as a Whig, from Winchelsea. When, in November, 1830, the Wellington Ministry gave place to that of his father, Earl Grey, he became Under Secretary for the Colonies. In this position he introduced a bill for the encouragement of emigration, and opposed the practice of making large land grants. In 1833 he resigned his office, on account of the refusal of the Cabinet to undertake the emancipation of slaves in the West Indian colonies. For the first six months of 1834 he was again in office as Under Secretary for Home Affairs, and in April, 1835, became Secretary of State for War in Lord Melbourne's Cabinet, and received an appointment as Privy Councilor. The independence which marked his whole career led in 1839 to his withdrawal from the Cabinet, because of his opposition to its measures in regard to colonial affairs, particularly the crisis in Canada. He continued to take a prominent part in Parliamentary debates, and was the author of the amendment to the Irish Franchise Bill in 1841 which eventually led to the defeat of the Government.

He took advanced views in favor of free trade, and his speeches had an important influence in leading his party to accept that doctrine. Upon the death of his father, in 1845, he succeeded to his title and took his seat in the House of Lords, where he soon became the Whig leader. Upon Lord John Russell's attempt to organize a Ministry in December, 1845, he was offered a portfolio, but refused at the time, because Lord Palmerston had also been invited to join it. Six months later he changed his mind, and became Secretary for the Colonies in the same Cabinet in which Lord Palmerston was Foreign Secretary. His administration of the Colonial Office, which lasted until 1852, was marked by many experiments, not all of which were successful, by a policy of extension of representative government to the colonies wherever practicable, and by the establishment of colonial free trade, the later abandonment of which he always deemed to be a mistake. From the close of Lord Russell's Administration in 1852 until his death, although never again holding office, he was an active and important figure in Parliament. He pursued a course of great independence, allied himself with neither party, always sharply criticised both Liberals and Conservatives, particularly in their administration of colonial and foreign affairs, and was one of the most strenuous opponents of Gladstone's home-rule policy for Ireland. He wrote: *The Colonial Policy of Lord John Russell's Administration* (2 vols., 1853); *Parliamentary Government* (1858); *Free Trade with France* (1881); *Ireland: the Causes of Its Present Position* (1888); *The Commercial Policy of British Colonies and the McKinley Tariff* (1892); and edited his father's *Correspondence with William IV.* (1867).

GREY, Lady Jane (c.1537-54). The great-granddaughter of Henry VII., and second cousin of Edward VI., daughter of Henry Grey and Lady Frances Brandon. Her teacher, Aylmer, afterwards Bishop of London, taught her Greek, Latin, French, and Italian, in addition to something of the arts and sciences. At the age of nine she entered the household of Queen Catharine Parr, with whom she remained till the death of that lady two years later, when she appeared as the chief mourner. After Catharine's death she became the ward of Thomas Seymour, whom the Queen had married on the death of Henry VIII. Seymour planned to marry her to Edward VI.; but in this he was thwarted by his brother, the Duke of Somerset, who wished Edward as the husband of his own daughter. This rivalry led to the death of her guardian. Her father, now Duke of Suffolk, after the fall of Somerset in 1549, allied himself with John Dudley, Duke of Northumberland, perhaps the ablest man—certainly one of the most ambitious men—of his time. Northumberland was now Lord Protector to Edward VI., and resolved to win the crown for his own family. To this end he arranged a marriage of Lady Jane with his fourth son, Guildford Dudley, and persuaded Edward to change the order of succession as established by Henry VIII., passing his sisters, Mary and Elizabeth, thus leaving the crown to his cousin, Lady Jane. Lady Jane seems to have been kept in ignorance of the intent of her father and father-in-law until the death of Edward (July 6, 1553). Two days later the public announcement was made, and on the 9th she was taken before the Council for acknowledgment. At this meeting she is said to have swooned, and only after the most earnest persuasion was she prevailed upon to issue the proclamation of her accession to the throne. In ten days the intrigue was ended; Mary was the acknowledged Queen of England. Mary recognized Lady Jane's innocence, and for some months resisted the demands of the Spanish Minister and the radicals of Mary's party that she should be tried and beheaded. Her father weakly joined the Wyatt rebellion, thus losing his own life and bringing death upon his daughter, who with her husband was beheaded February 12, 1554. For her life, consult: Agnes Strickland, *Queens of England*, ii. (London, 1875-80); Froude, *History of England*, i., ii. (New York, 1871); Lingard, *History of England*, ii. (Boston, 1853-56); Green, *History of the English People*, ii., 145 f. (New York and London, 1899). Original material may be found in *Letters and Papers of Henry VIII.*, edited by Brewer and Gairdner, for the "Rolls Series"; Ellis, *Original Letters, First Series* (London, 1824).

GREYCOAT SCHOOL, or **HOSPITAL.** A noted London charity school, founded in 1698 by Anne, the future Queen of England, for the education of poor boys and girls. The uniform of the inmates is gray in color. It is now a school for 400 girls.

GREYFRIARS. A Franciscan monastery in London, established during the reign of Henry III., and once the burial-place of many prominent persons. Its site was till 1902 occupied by Christ's Hospital.

GREYHEN. The female of the blackcock (q.v.).

GREYHOUND (AS. *grighund*, Icel. *greyhundr*, greyhound, from Icel. *grey*, dog [cf. *grey-baka*, bitch, *grey-karl*, dogged churl], Ir., Gael. *greck*, hound + *hundr*, AS. *hund*, Goth. *hunds*, hound; ultimately connected with Lat. *canis*, Gk. κύων, *kyōn*, OIr. *cu*, Lith. *szů*, Skt. *śvan*, dog). Specifically and colloquially, the term 'greyhound' indicates the dog used in England to course the hare, and in America the jack-rabbit. But, in a broader sense, and in fact, the greyhounds are a group of dogs generically known as 'long dogs,' having a common origin and form, and, in all cases but one, a uniform method of pursuing their quarry—that is, by sight and not by scent. They vary from each other only in their hairy covering and the kind of game which they pursue, both of which characteristics are due to local environment. The group embraces the English and American greyhounds, the borzoi or Russian wolfhound, the Scotch deerhound, the Irish wolfhound, the Persian and Levantine 'long dogs,' and the Italian greyhound.

The earliest notices of the long dogs in literature are those in Ovid's *Metamorphoses*, and in the poem on "Hunting" by Gracian the Faliscan. Mention of the *Canis Gallicus* is also to be found in the works of Martial, Julius Pollux, and Oppian. In the time of Arrian (A.D. 150) coursing with greyhounds had become an established recreation, and in the *Cynegetica* of Nemesian, in the third century, the greyhound, and the arts of breeding, rearing, and feeding him, are treated at length. There is no doubt as to the similarity of these dogs to the entire group of the dogs of to-day. The greyhound was so highly esteemed that it was protected even by the Salic, Burgundian, and German barbaric codes, and Spelman is authority for the statement that at the Court of Charlemagne there was a special officer of the greyhound kennel.

The essential characteristics of both the English and the American greyhound are keen sight and great speed, consequently they have great muscular development of the hind legs and great chest capacity. The standard laid down by the Greyhound Club, the ruling authority on the subject, comprises the following points: "Head, large between the ears, and pointed; long, strong jaws; eye bright and penetrating; ears small and folding when at rest, but semi-pricked when at gaze; a chest fairly deep, and as wide as consistent with speed; strong shoulders, a broad and powerful back, and very muscular hind quarters." The hair is as close, short, and fine as velvet. Color in the modern dog is by no means as uniform as it must have been in early times, when black or black and white prevailed.

Irish Wolfhound or Greyhound. This variety has a legendary history of great antiquity, and it was often seen in the Roman arena. The breed has never been absent from the royal kennels of England since the reign of King John. Undoubtedly up to the time of the disappearance of the last wolf, about 1710, it was a great rough-coated dog of the greyhound type. As the wolf became scarce and the dog began to be used more for hunting deer and foxes, it became smaller and more slender, though still of proportions exceeding any other of this type of dog. One measured early in the nineteenth century for the Linnæan Society was 61 inches long, including the tail (17½ inches), and stood 28½ inches high at the shoulder. The hair had by that time become shorter and smoother, and the color varied from browns to black and white. Gradually the breed became smaller, until about 1850, when interest in it revived, and to-day there are clubs on both sides of the Atlantic devoted to its development. The standard adopted is that of the earlier rough-haired dog, with a minimum height for dogs of 31 inches and 120 pounds weight, with 28 inches and 90 pounds for bitches. Large modern specimens have been bred. 'Thiggum Thu' was 34 inches high, and his female mate 30, yet both were true to the type and graceful in their movements.

Scotch Deerhound. This is one of the oldest British breeds, is still used for deer-hunting in the Scottish Highlands, and hunts by both sight and scent. In general appearance it strongly resembles the old Irish wolfhound, with a rough-haired coat, a bearded snout, and half-pricked ears; but it is sharper, swifter, and more sagacious than the Irish hound. It is a great favorite wherever it goes. The clubs especially devoted to it call for dogs from 28 to 30 inches high, or even more, weighing from 85 to 105 pounds, with harsh wiry hair 3 to 4 inches long, straight strong fore legs, and hind legs well bent at the stifle, with great length from hip to hock; a chest deep rather than broad, and a very strong neck, an essential for holding a deer. The earliest record of the Scotch deerhound is on the sculptured stones in the churchyard of Meigle, in Perthshire, Scotland, which Chalmers attributed to the ninth century.

Borzoi or Russian Wolfhound. This variety, sometimes called 'psovie,' is one of the greyhound family adapted to withstand the intense cold of the Asiatic plateaus and to travel over snow. To this end all these hounds, whether from Tibet, Persia, or Russia, have an abundance of warm, silky hair, and large hair-covered feathery feet. The modern specimens, from which the typical show dog is chosen, come from Russia, where the czars have for a long period maintained a large kennel of the best specimens. In that country they are used to kill wolves, and are trained for that purpose. When wolves are sighted the dogs are unleashed. Their great speed enables them to overtake the wolf, which they strike with their fore shoulder and knock over; as the wolf rises another dog strikes it in like manner, until the huntsman following on horseback arrives and kills the wolf with spear or knife. While ferocious in the chase, this great hound is at other times most docile and good-tempered. There are two breeds, the Circassian, or shorter-coated, by some considered the better for deep soft snow; the other having a long, silky, flowing coat, reaching sometimes on the body to a length of 5 inches, while on the tail it sometimes grows to be 14 inches long. The height of good specimens varies in males from 28 to 33 inches, and in females from 26 to 30, and they should weigh from 75 to 105 pounds for dogs, and 60 to 80 pounds for bitches. The legs are very flat in the bone, giving them an exceedingly slender look from the front, and the feet are long, with a profusion of soft hair. The hind legs are set somewhat forward, which gives the dog, when standing, the appearance of being slightly hump-backed. The chest is deep and not wide, and the sides are flat, wherein this dog differs entirely from the English greyhounds. In color the dogs vary, black and white and tan alternating in well-defined patches.

The 'brinjaree' is a variety of the rough or long-haired borzoi, used in the Deccan of India, and said to be the best hunting-dog in the East Indies. It is generally yellow or tan in color.

ITALIAN GREYHOUND. This is a fancy variety of the true greyhound in miniature, probably first bred as a toy or ladies' pet, which it has remained for many hundred years past. It is only needful to mention that dogs should not exceed 7 to 7½ pounds in weight, and females 5 pounds, to indicate the necessity of daintiness in build, while symmetry of head and neck is essential to perfection. Color is a matter of individual taste; they range from black through the blues to fawn, and even, though rarely, to all white. The last is the most esteemed color at present. The Italian greyhound must be looked at entirely from an artistic and not a utilitarian standpoint. They are prancing, dainty little luxuries, and nothing more.

WHIPPET. This is the last development from a small greyhound crossed by the terrier. It was originally bred for rabbiting; but it developed such a propensity for racing that whippets are now mainly used for that sport. At the farther end of the proposed course the dogs' handler stands and shakes a rabbit-skin or cloth, which excites the dogs to a high pitch. They are then released, and will race to that point at a speed exceeding that of any other dog. The form of the greyhound predominates in them; but their eagerness to contest and undying pluck are derived from their terrier blood. As a rule 15 pounds is taken as handicap weight.

Consult authorities cited under DOG; and see Plate of HUNTING AND WATCH DOGS.

GREYLAG. See GOOSE.

GREYLOCK, grā'lŏk. The highest mountain in Massachusetts, situated near the village of South Adams, Berkshire County (Map: Massachusetts, A 2). It is 3535 feet high, and commands a remarkably fine view, overlooking the valley of the Hoosac and its villages on the north, beyond which are visible the peaks of the Green Mountains and Mounts Monadnock and Wachusett, and the Hudson River. On the south are the Berkshire Hills, and far away to the southwest, beyond the Hudson, may be seen the Catskills. A large tract of the upper part of the mountain has been purchased by the State for a park.

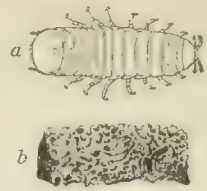
GREY'MOUTH. A seaport of Grey County, South Island, New Zealand, at the mouth of the Grey River, on the west coast, 105 miles northwest of Christchurch, and 190 miles south-southwest of Nelson (Map: New Zealand, C 5). It is connected with both of these towns by rail. It has fine harbor accommodation, with extensive wharfage, and is important as the centre of a considerable coal-mining and auriferous district. Population, in 1901, 3800.

GREYSON, grā'zŏn', EMILE (1823—). A Belgian novelist, born at Brussels. In his youth he devoted himself to literary production, and one of his first novels was *Fiamma Colonna* (1857). His other novels include: *Les récits d'un Flamand* (1859); *Sites ardennais* (1860-62); *Les magots de Téiers* (1863); and *Aventures en Flandre* (1882).

GREY'SON, R. E. H. A quasi-anagrammatic pseudonym of Henry Rogers.

GREY'TOWN. See SAN JUAN DEL NORTE.

GRIBBLE (of obscure origin; possibly connected with *grubble, gropple,* to grope, AS. *grāpian,* to grasp, from *grīp,* grip, from *grīpan,* to grasp, or with *grub,* Ger. *grübeln,* to dig; connected with Ger. *graben,* AS. *grafan,* to dig, Eng. *grave,* and probably Gk. γράφειν, *graphein,* to write). A minute boring isopod (*Limnoria lignorum*), which abounds upon the northern seacoasts, and sometimes does serious damage by perforating piles and submerged woodwork, for the sake of feeding on the wood. Where present it is extremely numerous, and in America is most destructive in California. Chemical treatment of timber is recommended.



A GRIBBLE.
a, adult isopod (*Limnoria lignorum*); *b*, a piece of wood perforated by its burrows. Greatly magnified.

GRIBEAUVAL, grē'bō'vàl', JEAN BAPTISTE VAQUETTE DE (1715-89). A French general, born at Amiens, and famous for the reforms he inaugurated in the artillery system of his day. In 1732 he joined the Royal Artillery, and three years afterwards became an officer in the Engineer Corps, devoting himself especially to the study of mines, in which branch of the service he received his captain's rank in 1752. He was the author of a very valuable report to his Government concerning the use of light artillery with bodies of infantry (a system then being inaugurated by the Prussian Army), together with a complete report concerning Prussian fortifications. In 1757 he entered the Austrian service, serving during the Seven Years' War, in the course of which he directed the siege of Glatz, and held Schweidnitz against Frederick II. of Prussia for two months. He was taken prisoner, but afterwards was exchanged, and was made a lieutenant field-marshal. Upon his return to France he began to work for a complete system of reform in the French artillery service. He organized separate corps of artillery for the coast defenses, permanent garrisons, and fortified works, together with mobile units for field service and heavier pieces for siege purposes. Previous to this artillery of varying calibre and design had been indiscriminately scattered throughout the army. Much of Napoleon's success as a tactician and strategist was due to the improvements and reforms rendered possible by Gribeauval, who not only succeeded in reducing the weight and clumsiness of field artillery, and thus gave to it the mobility which so materially aided Napoleon, but, more important still, brought about a uniformity of design in manufacture, together with many improvements in explosives and projectiles. See ARTILLERY.

GRIBOYEDOFF, grē'bō-yĕd'ôf, ALEXANDER SERGÉYEVICH (1795-1829). A Russian dramatic poet and statesman, born at Moscow. His mother gave him the best obtainable education, preparing him for a diplomatic career. By the time he entered Moscow University, he knew French, German, English, Italian, and had studied music both practically and theoretically. On leaving the university he entered military service when Napoleon invaded Russia, but never got to the

fighting line, and, becoming tired of inaction, resigned in 1816. A year previously he translated De Lesser's work *Secret du ménage*, and in 1817 Barth's *Fausses infidélités*. His comedy, *Misfortune of Being Too Clever*, was read to his friends in 1824; but the censor found the play too pointed, and did not permit its publication, with the result that the comedy circulated in thousands of manuscript copies. The only performance of the comedy the author ever saw was at a private theatrical in Erivan in 1825; the first public performance took place in 1831. Griboyedoff was commissioned by General Paskievitch to carry on the peace negotiations with Turkey and Persia, and for this service Emperor Nicholas I. made him Minister Plenipotentiary at Teheran. Here, with thirty-six others, he was slain, sword in hand, defending the embassy against an unruly mob during an uprising at the Persian capital. The singular literary merits of his only original comedy, *Misfortune of Being Too Clever*, seem to give sufficient ground to believe that death probably cut short the career of one of Russia's greatest poets. The comedy, over which he brooded and worked in all nearly ten years, is a satirical picture of the struggle between two generations about 1820. The characters are endowed with bold traits typical of all periods of transition, when one part of society desperately clings to the obsolete forms, while the other, in the enthusiasm of reform, is eager to break with the old. But the great vitalizing spirit of the comedy, besides its masterly character drawing and biting satire, is its remarkable style—a style defiant of all canons of dramatic construction—and its still more remarkable language. The best edition of Griboyedoff's works is that by I. A. Shlyapkin, with exhaustive notes and bibliography (Saint Petersburg, 1889). For an analysis of the play, consult: Gontcharoff, *Million of Tortures*, vol. ix. of collected works (Saint Petersburg, 1899); Veselofski, *Russian Library*, vol. v. (1875). The comedy has been translated into German (1831 and 1853), Polish (1857), English (1857), French (acts iii. and iv., 1858), and Georgian. The best German translation, entitled *Verstand schafft Leiden*, is by Dr. Bertram (Leipzig, 1853). The latest in French is by A. Legrelle, *Le malheur d'avoir de l'esprit* (1885), with a biographical sketch.

GRID'LEY, CHARLES VERNON (1845-98). An American naval officer, born at Logansport, Ind. He graduated at the United States Naval Academy in 1863; served in the West Gulf blockading squadron in the Civil War, participating in the battle of Mobile Bay (1864), and was assigned to various vessels up to 1875, when he was stationed at the Naval Academy for four years. In 1882 he was commissioned commander. He was navigation officer at the Boston Navy Yard from 1882 to 1884; was inspector of the Tenth Lighthouse District from 1887 to 1891; and served as lighthouse inspector from 1895 to 1897, when he was promoted to be captain, and given the command of the *Olympia*, the flagship of the Asiatic Station. He directed his vessel in person, though seriously ill, at the battle of Manila (May 1, 1898), and received the commendation of Admiral Dewey for his skill and courage. He was given sick leave immediately after the engagement, but died, while on his way home, at Kobé, Japan.

GRIDLEY, RICHARD (1711-96). An American soldier, born in Boston. He held the rank of lieutenant-colonel of engineers at the first capture of Louisburg, and took part in several colonial wars. In 1775, as engineer-in-chief of the Massachusetts troops at Cambridge, he laid out the fortifications on Breed's Hill, and the next day he commanded the American artillery in the action known as the battle of Bunker Hill. Later he fortified Dorchester Heights, and, after the British left Boston, directed the erection of works around the harbor. He was commissioned major-general by Congress, and commanded the Continental Artillery from September 20th till November, 1775, when he was superseded by Colonel Knox.

GRIEBEN, grē'ben, HERMANN (1822-90). A German journalist and author, born at Köslin, and educated at Breslau. He founded the *Pommersche Zeitung* at Stettin in 1853, and in 1859 became one of the editors of the *Kölnische Zeitung*. His works include a political drama, *Liebfraue* (1855), and the popular collection of songs entitled *Rheinische Wanderlieder* (3d ed. 1884). The third edition of his collected poems was published in 1884.

GRIEG, grēg, EDVARD HAGERUP (1843—). A Norwegian composer and pianist, born at Bergen, Norway, June 15, 1843, one year after the birth of the unfortunate Rikard Nordraak (1842-66), who afterwards exercised so powerful an influence upon the expression of Grieg's genius. On the completion of his studies at Leipzig, in 1862, he went to Copenhagen for a period of study with Gade, whom he determined to emulate, and immediately plunged into a close study of Norse Saga literature, legendary lore, folk-music, and national melodic characteristics. It was at this period of his development that Rikard Nordraak entered into his life, and by his greater insight made clear to Grieg the path of which the latter was in search. Quite a number of vocal romances, the *Humoresken* (op. 6), the E minor piano sonata (op. 7), and the F minor piano and violin sonata (op. 8) are souvenirs of this friendship. The winter of 1865-66 was spent in Rome, after which he made Christiania his home for eight years. His residence in the latter city was inaugurated by a concert of Norse music which he gave, and at which Mina Hagerup (whom he later married) sang romances written by Nordraak, Kjerulf, and himself. A stay of a few months in Rome, in 1870, was made possible by the grant of a Government stipend. Here he received much encouragement from Liszt, to whom he dedicated his *Foran Sydens Kloster* (from Björnson's *Arnljot*), a work of magnificent power and conception. Next followed important engagements in England and Germany, where he was held in the highest esteem. Grieg has been called the Chopin of Northern music, because of the undercurrent of melodic nationality in his work, yet, on the other hand, the vigor and constantly recurring note of defiance is as certainly akin to Schumann. Of his larger compositions, the *Peer Gynt Suite* is perhaps the most widely known, and of his smaller works, the short piano compositions are universally popular. An excellent biographical sketch is Closson, *Edvard Grieg et la musique scandinave* (Paris, 1892).

GRIEPENKERL, grē'pen-kerl, CHRISTIAN (1839—). A German painter, born in Olden-

burg. He studied under Rahl in Vienna, and after the success of his picture "Œdipus Led by Antigone," assisted Rahl in the decoration of the Vienna Opera House and other works he had designed. When Rahl died, Griepenkerl and Bitterlich completed some of his undertakings. Then Griepenkerl alone did the decorative paintings in various palaces, and in the new Houses of Parliament, all in Vienna, and designed the frescoes in the Academy of Science in Athens. Most of these paintings treated mythological scenes, where his rich fancy and fine coloring had much scope. He also painted a number of portraits. In 1874 he was made professor at the Vienna Academy.

GRIEPENKERL, Wolfgang Robert (1810-68). A German dramatic author and writer on æsthetics, born at Hofwyl, Switzerland. He was appointed professor of German literature at the Cadet School in Brunswick. During the last twenty years of his life he devoted himself entirely to literary work and public readings of his plays, which include the tragedies, *Maximilian Robespierre* (2d ed. 1851); *Die Girondisten* (1852); *Auf Sankt Helena* (1862). All these well-known works are distinguished by a mastery of technique and a great power of conception and of diction.

GRIER, grēr, William Nicholson (1812-85). An American soldier, born in Pennsylvania. He graduated at the United States Military Academy in 1835, served in many Indian campaigns on the Western border, took an active part in the Mexican War, and in 1848 was brevetted major-general for gallantry at the battle of Santa Cruz de Rosales. After additional military service on the frontier, he came east at the outbreak of the Civil War, and served until the end, and was made lieutenant-colonel of the First Cavalry early in 1862. He took part in the Peninsular campaign, was wounded at the battle of Williamsburg, acted as chief recruiting officer in Ohio, Iowa, and Pennsylvania, and in 1865 was brevetted brigadier-general of the United States Army. The next year he was promoted to be colonel of the Third Cavalry, and he retired in 1870.

GRIERSON, grēr'son, Benjamin Henry (1826—). An American cavalry officer, born in Pittsburg, Pa. At the outbreak of the Civil War he was appointed a major in the Sixth Illinois Cavalry, and rose to the rank of colonel before April 17, 1863, when Grant sent him on a raid from La Grange, Tenn., to Baton Rouge. In sixteen days he led his forces 600 miles; tore up railroads and telegraph lines, completely cutting off Vicksburg's communications with the East, destroyed great quantities of arms and supplies, and then brought his men into Baton Rouge so exhausted that many of them fell asleep in their saddles. For his services on this occasion he was brevetted brigadier-general on March 2, 1867, and on the same date was brevetted major-general for his services during another raid in 1864. He was commissioned major-general of volunteers on February 10, 1865, and the next year was appointed colonel of the Tenth United States Cavalry, and assigned to duty in the Southwest. He was retired in 1890 with the rank of brigadier-general in the Regular Army.

GRIERSON, George Abraham (1851—). An Irish Orientalist, born at Glenageary, County Dublin. He was educated at Shrewsbury and Trinity College, Dublin, and received the degree of Ph.D. *honoris causa*, from the University of Halle in 1894. In 1873 he entered the Indian Civil Service. Dr. Grierson's many publications contribute largely to the knowledge of the vernacular languages of India. Among these the most important of his works are: *Introduction to the Maithili Language of North Bihar* (1882); *Seven Grammars of the Dialects and Sub-Dialects of the Bihari Language* (1883-88); "The Modern Vernacular Literature of Hindustan," in *Journal of Asiatic Society*, vol. lvii. (1889); and his most important work, the great *Linguistic Survey of India* (1898).

GRIERSON, Sir Robert (c.1655-1733). Laird of Lag and persecutor of the Covenanters. Lag was a strong supporter of the Government, and so loyally did he assist Claverhouse in repressing Conventicles that he was made justice of the military court at Kirkcudbright in 1681. He enforced the Test Act with thumbscrews and other torture, and in the persecution which followed the act, punished with death refusal to take the oath of abjuration. He was accused of diabolic delight in the torture of his victims. Up to the middle of the nineteenth century his name was preserved in rude country drama, in which his part was that of a bloody monster. On the accession of James II., Grierson was made a baronet and received an annual pension of £200, honors which came close on his condemnation of the 'Whigtown martyrs.' After the fall of James he was twice seized as a suspect, but was released on bail. For refusing the oath of allegiance (1693), he was frequently arrested, and so often fined that he was nearly ruined. He took no active part in 'the '15,' although his son William was captured at Preston. He was the original of Sir Robert Redgauntlet in Scott's *Redgauntlet*. Consult Fergusson, *Laird of Lag* (Edinburgh, 1885).

GRIES, grēs, Johann Diederich (1775-1842). A German poet and translator. He was born at Hamburg, and was educated for the legal profession at Jena, but subsequently devoted himself to literary work, and became known for his excellent translations of Italian and Spanish authors. His best translations are of the *Gerusalemme liberata* of Tasso, *Das befreite Jerusalem* (14th ed. 1880); of the *Orlando furioso* of Ariosto, *Der rasende Roland* (4th ed. 1851); and the dramatic works of Calderon (3d ed. 1865).

GRIESBACH, grēs'bäg, Johann Jakob (1745-1812). A noted New Testament scholar. He was born at Butzbach in Hesse. He received his early training in the schools of Frankfort-on-the-Main, where his father was for some time a prominent preacher. In his eighteenth year he began his university course, studying at Tübingen, Halle, and Leipzig. At Halle he was greatly influenced by Semler. After an extended visit to seats of learning in Holland, England, and France, he became a docent in theology at Halle in 1771. In 1773 he was made professor. Two years later he was called to Jena, where he remained until his death in 1812. While a university student, Griesbach became interested in the study of the text of the New Testament, and to the task of collecting material for and elucidating the principles of the textual criticism of the New Testament he devoted his life. His labors mark an epoch in the

history of this science. His classification of the ancient authorities for the text, i.e. manuscripts, versions, and citations, into three great families, Alexandrine, Western, and Byzantine, is still recognized as substantially correct. His formulation of the principles according to which the evidence for or against variant readings should be weighed was valuable, though his application of the same was too mechanical. He published several critical editions of the Greek New Testament, of which the second (Halle and London, 1796-1808) is the most important. Of his other writings, his *Symbolæ Criticæ ad Supplendas et Corrigendas Varias Novi Testamenti Lectiones* (1785-93) deserves most attention.

GRIESINGER, grē'zing-ēr, KARL THEODOR (1809-84). A German author. He was born at Kirnbach, Baden, and was educated at Tübingen. Accused of treasonable utterances published in the *Volkswehr*, a radical journal edited by him during the Revolution of 1848, he was imprisoned for two years. From 1852 to 1857 he lived in the United States, and as the fruit of his observations there published the interesting works entitled: *Lebende Bilder aus Amerika* (1858); *Emigrantengeschichten* (1858); *Die alte Brauerei, oder Kriminalmysterien von New York* (1859); and *Land und Leute in Amerika* (2d ed. 1863). His descriptions of Swabian life are also popular, while the work entitled *Die Maitressenwirtschaft in Deutschland im 17ten und 18ten Jahrhundert* (1874) is an interesting description of the Court life of Germany in former times.

GRIESINGER, WILHELM (1817-68). A German physician. He was born at Stuttgart, and was educated at Tübingen, Zurich, and Paris. After holding a professorship at Kiel, he accepted a call in 1850 to Cairo, Egypt, where he became physician-in-ordinary to Abbas Pasha, Viceroy of Egypt, and director of the medical school, which positions he held until 1852. He subsequently became associated as director with several prominent institutions for nervous diseases and insanity in Germany, and also held professorships at Zurich and Berlin, where he founded the *Archiv für Psychiatrie und Nervenkrankheiten*. His chief publications include: *Pathologie und Therapie der psychischen Krankheiten* (3d ed. 1871), and *Infektionskrankheiten* (2d ed. 1864).

GRIEUX, grē'ē', LE CHEVALIER DE. The hero of Prévost's *Manon Lescaut*, and the lover of Manon. He accompanied her on the transport to New Orleans, and after her death returned to France.

GRIFFENFELD, grif'fen-fēld, PEDER SCHUMACHER, Count (1635-99). A Danish statesman, born at Copenhagen, son of a wine merchant of German extraction. He was educated by private tutors, then at the University of Copenhagen, and after his father's death (1650) at Leyden (1655-57) and at Oxford (1657-60). On his return to Denmark (1662), after travels in France, Italy, and Germany, he gained the favor of King Frederick III., and was appointed head of the privy archives and librarian on the new royal foundation. He was a zealous supporter of the King's claim to absolute power, and framed the *Lex Regia Danica;* was in 1671 rapidly advanced under Christian V., was knighted and became a Privy Councilor, and two years later the King made him Chancellor and a Count of Denmark. But his position and his foreign policy made him rivals and many enemies, and in 1676 he was charged with high treason. The death sentence, though pronounced, was not carried out, but he was imprisoned, and gained his freedom only a year before his death.

GRIF'FIN. A city and the county-seat of Spalding County, Ga., 43 miles south of Atlanta, on the Southern and the Central of Georgia railroads (Map: Georgia, B 2). It has an extensive trade, being the centre of a productive cotton and fruit-growing region. There are large cotton mills and gins, an iron-foundry and machine-shop, a chair-factory, etc. The city has some reputation as a resort, and is near the site of the State Experimental Farm. The water-works and electric-light plant are owned by the municipality. Population, in 1890, 4503; in 1900, 6857.

GRIFFIN (from OF. *grifon*, Fr. *griffon*, ML. *grypho*, from Lat. *gryphus*, griffin, variant of *gryps*, from Gk. γρύψ, *gryps*, griffon, from γρυπός, *grypos*, hook-nosed; confused by popular etymology with Gk. γύψ, *gyps*, vulture). A fabulous creature, half animal, half bird, imagined by the ancients. It was usually described in literature and represented in art as having the head, beak, and wings of an eagle and the body and legs of a lion. This creature was conceived by the peoples of the valley of the Tigris and Euphrates as one of the chimerical genii or natural forces in the service of the powers of good, like the bull and the lion, either animal-headed or human-headed, but less material than these, and like them a guardian and protector of man and the treasures of earth. Among the Babylonians its evil counterpart was the dragon Tiamat. In Assyrian sculpture it is represented in colossal size on a slab from Koyunjik in the British Museum and in the embroidered figures on the royal robes. It was even more popular in Persian art, being given as rampant, with high crest, on reliefs from the royal palaces (e.g. Persepolis), and on cylinders and seals.

Thence the myth passed to the Ægean peoples and to the Greeks, as well as to the Hittites and Egyptians. The griffin appears on the battle-axe of King Amasis, in Syrian and Phœnician gems, and on bas-reliefs from Mycenæ. The form of the legend in historic Greek times betrays its Oriental derivation. It appears on the great bronze Phœnician shields from Mount Ida in Crete, on the imported Phœnician and Greek objects in early Italian graves, on Corinthian vases —usually in a long procession of griffins. It is recorded that griffins formed part of the decoration of the bronze patera ordered by the Samians (c. 640 B.C.). (Herodotus iv. 152.) Later it appeared on the helmet of Phidias's famous statue of Athena. It was also connected by the Greeks with other deities, such as Dionysus and Nemesis, but especially with the twin gods Artemis and Apollo. Artemis, in her form adapted from the Persians, holds in each hand a griffin, on archaic Greek vases and on archaistic sculptures such as the throne in the Dionysus Theatre at Athens. Even more close was the association with the sun-god, Apollo, whose chariot it is often represented as drawing, especially in that form of his myth which represents him as withdrawing each year to the regions of the north. The early Greek writers, such as Hesiod and Aristeas, describe the griffins

as dwelling in the Rhipæan mountains at the north, near the Hyperboreans and the evil one-eyed Arimaspeans, who, mounted on horses, seek to seize the treasure of gold guarded by the griffins. At a later period the scene of this guarding of the gold was transferred to India. This idea of guardianship was transferred to other spheres, and we find griffins on sarcophagi as keepers of the dead. Many Greek cities of Asia Minor adopted them as types on their coins, as guardian genii of the city, such as Assos, Smyrna, Panticapæum, and Phocæa, evidently under Persian influence.

The Romans lost the poetry and significance of the myth, using the griffin as a mere decorative *motif*, in friezes, on table-legs, altars, and candelabra, as well as in wall paintings. But the symbolism was never entirely lost in the East, and reappeared in Christian times in the Bestiaries, so called, of Saint Basil and Saint Ambrose, as part of the peculiar animal symbolism that penetrated the Middle Ages. The heraldic affronted griffins were common in Mohammedan, in Persian, and in Byzantine art—especially in stuffs, ivories, and metal-work—passing to the West in the Middle Ages, as is shown, for instance, in many Anglo-Saxon illuminated manuscripts. The legend itself was transformed by Moslem story-tellers, and the form it took is related by those incomparable story-tellers, Marco Polo and Sir John Mandeville, who describe the griffin as a real creature, whose home is in Madagascar, in the form of a powerful and colossal eagle, several times the size of a lion, which it could lift into the air.

The Renaissance rehabilitated the classic form of the griffin, using it, like Roman art, for decorative purposes very freely. It also became popular on family arms and heraldic devices, especially in Great Britain, with the old idea of guardianship, several hundred families (especially in Wales) adopting it as their emblem, but usually replacing the fore paws of the lion by the eagle's claws. In a few instances the griffin ends in a serpent's tail. The attributes of the griffin were swiftness and strength in the service of watchfulness.

GRIFFIN, Charles (1826-67). An American soldier, born in Ohio. He graduated at West Point in 1847, and served in the Mexican War, at the close of which he was assigned to duty on the frontier. On the outbreak of the Civil War he joined the Army of the Potomac, and commanded the Fifth Artillery at the first battle of Bull Run. He was made a brigadier-general of volunteers in 1862, and took part in most of the important battles fought by the Army of the Potomac during the following campaigns. On May 6, 1864, he was brevetted lieutenant-colonel for gallant and meritorious services at the Battle of the Wilderness, and in August of the same year he received the brevet rank of major-general of volunteers. Nine months later he was given the actual rank of major-general of volunteers. After the surrender at Appomattox he received the arms and colors of the Confederate army, and was one of the commission appointed to carry out the conditions agreed to by Grant and Lee. In 1866 he was appointed colonel of the Thirty-fifth Infantry, and was assigned to duty in the Southwest, where he died.

GRIFFIN, Edward Herrick (1843—). An American educator, born at Williamstown, Mass. He graduated at Williams College, and afterwards at the Union Theological Seminary. He was professor at Williams College from 1872 to 1889, when he was appointed professor of the history of philosophy and dean of the college faculty in Johns Hopkins University.

GRIFFIN, Gerald (1803-40). An Irish dramatist, novelist, and poet, born in Limerick. He did some newspaper work in Limerick, and at the age of twenty went to London. He contributed to periodicals, and published novels, which met with much success. Among them are: *Holland Tide* (1827); *Tales of Munster Festivals* (1827); *The Collegians* (1829), of which an edition, illustrated by Phiz, appeared in 1861, under the title of *Colleen Bawn;* and *Tales of My Neighborhood* (1835). About 1838 he entered the Catholic Society of Christian Brothers, among whom he died. His play *Gisippus*, declined in his lifetime by Charles Kean and others, was produced in 1842 by Macready and Helen Faucit. An edition of his novels and poems, with a biographical sketch by his brother, was published in eight volumes in 1842-43, and his *Poetical and Dramatic Works* were issued in 1857-59. Consult a sketch in Mitford, *Recollections of a Literary Life* (London, 1859).

GRIFFIN, Simon Goodell (1824-1902). An American soldier and legislator, born at Nelson, N. H. He represented his town in the State Legislature, and was admitted to the bar in 1860. During the Civil War, as colonel of the First Brigade, Second Division, Ninth Army Corps, he aided Grant in the siege of Vicksburg, and participated in Sherman's Mississippi campaign of 1863. The next year he commanded the Second Brigade, Second Division, in the Battle of the Wilderness, and at Spottsylvania was brevetted brigadier-general of volunteers on the recommendations of Generals Burnside and Grant. For his gallantry at the sieges of Petersburg and Richmond he was promoted to be major-general. After the war he lived in Keene, N. H. He was elected five times to a seat in the New Hampshire Legislature, and served in the last two terms as Speaker.

GRIFFINHOOFE, grif'fin-hōōf, Arthur. The nom-de-plume employed by Colman the Younger, in publishing his *We Fly by Night, Review, Gay Deceivers*, and *Love Laughs at Locksmiths.*

GRIFFIS, William Elliot (1843—). An American clergyman, educator, and author, born in Philadelphia. He served with the Forty-fourth Pennsylvania Regiment in the Civil War, and then entered Rutgers College, where he graduated in 1869. After one year of study at the Dutch Reformed Theological Seminary at New Brunswick, N. J., he accepted an appointment to organize schools on the American model in Japan, and was the first American teacher in regions beyond the open ports. On the fall of the feudal system and the unification of the Empire, he was appointed professor of the physical sciences in the Imperial University of Tokio. He prepared the "New Japan Series" of reading and spelling books and primers for Japanese students in the English language, and contributed to the Japanese press, and to newspapers and magazines in the United States, numerous papers of importance on Japanese affairs. In 1874 he returned to New York, where he finished his theological studies at the Union Theological Seminary; and

in 1877 was made pastor of the First Reformed Church in Schenectady, N. Y.; in 1886, of the Shawmut Congregational Church in Boston; and in 1893 of the Congregational Church in Ithaca, N. Y. He is the author of: *The Mikado's Empire* (1876); *Japanese Fairy World* (1880); *Asiatic History* (1881); *Corea, the Hermit Nation* (1882); *Sir William Johnson and the Six Nations* (1891); *Matthew Galbraith Perry* (1887); *The Lily Among Thorns* (1889); *Honda, the Samurai* (1890); *Japan: in History, Folklore, and Art* (1892); *Brave Little Holland, and What She Taught Us* (1894); *The Religions of Japan* (1895); *Townsend Harris, First American Envoy to Japan* (1895); *The Pilgrims in Their Three Homes—England, Holland, and America* (1898); *America in the East* (1899); *The American in Holland* (1899); *Verbeck in Japan* (1900); *The Pathfinders of the Revolution* (1900); and revised, with additional matter, Bayard Taylor's *Japan in Our Day* (1902).

GRIF'FITH, RALPH THOMAS HOTCHKIN (1826—). An English philologist and Sanskrit scholar, born at Corsley, Wiltshire. He was educated at Queen's College, Oxford, and then engaged in educational work in India. From 1863 until 1878 he was principal of the Benares College, and from that year until 1885 he was Director of Public Instruction in the Northwest Provinces. His publications on Oriental literature include: *Specimens of Old Indian Poetry* (1852); *The Birth of the War God* (1853); *The Rāmāyan of Valmiki* (5 vols., 1870-75; reprinted in one vol., 1895); *Yūsuf and Zulaikha* (1882); *The Hymns of the Rig Veda, Metrically Translated into English* (4 vols., 1889-92); *The Sāma Veda* (translated 1893); *The Atharva Veda* (1895-96); and *The Texts of the White Yajur Veda* (translated 1899).

GRIFFITH, WILLIAM PETTITT (1815-84). An English architect and archæologist, born in London. He attained considerable eminence in his profession, and designed several hospitals and schools in London. Among his writings are: *The Geometrical Proportion of Architecture* (1843); *The Natural System of Architecture* (1845); *Ancient Gothic Churches* (1847-52); and *Suggestions for a More Perfect and Beautiful Period of Gothic Architecture* (1855).

GRIFFITH GAUNT, OR JEALOUSY. A novel by Charles Reade, which appeared serially in the *Argosy*, and was published in 1866. It is a story of great power and pathos. It has been repeatedly and successfully dramatized.

GRIF'FITHS, JOHN WILLIS (1809-82). A naval architect, born in New York City. He built several United States war-vessels, introduced many innovations in the art of ship-building, and wrote a number of books on naval architecture, the most important of which, *A Treatise on Marine and Naval Architecture* (1850, 4th ed. 1854), was republished in England.

GRIFFON. A dog. See FIELD DOG.

GRIGGS, JOHN WILLIAM (1849—). An American politician, born in Newton, N. J. He graduated at Lafayette College in 1868, and was called to the bar in 1871. He began to practice law in Paterson, N. J.; was elected to the Legislature in 1876; and was a State Senator from 1882 to 1888. During the year 1886 he presided over the New Jersey Senate. In 1895 he was elected Governor of New Jersey, but resigned the office on January 31, 1898, to accept the position of Attorney-General in President McKinley's Cabinet, which he held until his resignation in April, 1901.

GRIGOROVITCH, grē'gō-rō'vĭch, DMITRY VASILYEVITCH (1822-1900). A Russian author. He was born in the Government of Simbirsk, and successively devoted himself to engineering, painting, and literature. His literary works include the tale entitled *The Village* (1846) and *Anthony the Unlucky* (1847). Of his later novels that entitled *The Fisher* (8th ed. 1889; German trans. 1857) has been the most successful.

GRIJALVA, grē-häl'vä (named in honor of its discoverer, Juan de Grijalva). A river of Southeastern Mexico, rising in Guatemala, flowing northwest, then northeast under various names through the provinces of Chiapas and Tabasco, and after a course of nearly 300 miles, emptying into the Gulf of Campeche (Map: Mexico, M 9). It is navigable for small steamers for about fifty miles, up to San Juan Bautista. Prior to 1765, when its course was artificially changed, it flowed past the town of Huimanguillo, emptying into the Bay of Dos Rocas, 60 miles west of its present mouth.

GRIJALVA, JUAN DE (c.1489-1527). A Spanish explorer, born at Cuellar (Old Castile). His uncle, Diego Velasquez, Governor of the island of Fernandina (Cuba), sent him to explore Mexico and Yucatan, where he discovered, in 1518, the river now bearing his name. He took possession of all that country in the name of the Emperor Charles V., and christened it New Spain. Despite the value of these discoveries, he was not rewarded upon his return to Cuba, but was dismissed from the Governor's service for not founding colonies in the country he had explored, and died afterwards in Nicaragua. The description of his voyage of discovery was published by Icazbalceta in *Colección de documentos para la historia de Méjico* (1858).

GRILD'RIG. In Swift's *Gulliver's Travels*, a name signifying a little man, given to Gulliver by the Brobdingnagians.

GRILLET, grē'yā', JEAN (c.1630-c.1675). A Jesuit missionary and explorer, born in France. In 1666, when the English took Guiana, he was superior of the Jesuit house in Cayenne; but, unlike many of his fellow colonists, did not take refuge among the Indians. A few years later he was sent on a mission to get information concerning the geography of the interior, and the customs and civilization of the tribes most distant from the sea. Accompanied by Father François Béchamel, who understood the Galibi language, Father Grillet set out on January 25, 1674. He succeeded in reaching a point about 570 miles southwest of Cayenne, in the country of the Acoquas, a tribe who had never before seen a white man. The two Jesuits returned to Cayenne on June 17th, and Grillet sent an account of their journey to France. This account was published afterwards under the title, *Journal du voyage qu'ont fait les pères Jean Grillet et François Béchamel dans la Guyane, l'an 1674*. It was republished in the second volume of Gomberville's *Relation de la rivière des Amazons* (1679-80), and in Roger's *Voyage Around the*

World (1716). Both of the explorers died soon after their return to Cayenne as a result of the hardships they had undergone.

GRILLPARZER, grĭl′pär-tsĕr, FRANZ (1791-1872). An Austrian poet and dramatist, born in Vienna, January 15, 1791. His father, a lawyer, died in 1809, leaving the family needy. After a harsh schooling at home, Grillparzer studied law in Vienna (1807-11), without making a brilliant success. Afterwards he made himself familiar with French, English, Italian, and Spanish. In 1813 he entered Government service in the financial department; in 1833 he was put over the archives; in 1847 he became a member of the Academy of Sciences, and in 1856 he retired. In the outer life of Grillparzer there is nothing very interesting. If we add to what has been said the fact that Grillparzer was once betrothed to a lady whom he always liked and never wedded; that he visited Italy in 1819, France and England in 1838, and went to Turkey and Greece in 1843, and finally that he died in great honor on the 21st of January, 1872, we know the most striking incidents in his life.

In German literature he is a link between Goethe, Herder, Schiller, and Lessing, who helped to shape his ideals, and a more modern school. Grillparzer was catholic in his theatrical likings. The suburban theatres pleased him, but he was also a methodical student of Haydn, Mozart, and Beethoven. In 1807-09 he wrote a drama, *Blanca von Kastilien;* later he turned to Goethe and Shakespeare. *Die Ahnfrau*, a fatalistic tragedy, was played first at Vienna (1817) and afterwards aroused enthusiasm throughout Germany. *Sappho* (1818), also a tragedy, caused the critics to class Grillparzer with Zacharie Werner, Müllner, and Houwald. This long vexed the poet. In 1822 followed *Das Goldne Vlies*, a trilogy, which fell somewhat flat. This failure Grillparzer laid to the oppressive rule of Metternich. In *König Ottokars Glück und Ende* the dramatist portrayed the rivalry between Rudolph of Hapsburg and Ottokar of Bohemia. For two years the censor kept this play waiting, on the ground that it was unseemly to put the founder of the dynasty on the stage. Thanks to the Empress, the piece was played with great success in 1824. After the cool reception of the tragedy *Ein treuer Diener seines Herrn* (1828) Grillparzer held aloof for ten years. On the refusal of *Wehe dem der lügt*, a comedy (1838), Grillparzer was utterly disheartened. *Der Traum ein Leben* (1834), after *La vida es sueño*, by Calderón, a dramatic tale, is played still with success in Germany. *Des Meeres und der Liebe Wellen* (1840) handles the theme of Hero and Leander. In 1848 the public seemed to be eager for the poet's reappearance, but he held aloof until his death. Consult: Sauer's *Biographical Introduction* to Grillparzer's *Collected Works* (Stuttgart, 1892); the *Jahrbuch* of the Grillparzer Gesellschaft (Vienna, 1890 ff.); Traube, *Grillparzer's Lebensgeschichte* (Stuttgart, 1884); Littrow-Bischoff, *Aus dem persönlichen Verkehr mit Franz Grillparzer* (Vienna, 1873); Lange, *Grillparzer, sein Leben, Dichten und Denken* (Gütersloh (1894); Friedmann, *Il dramma tedesco del nostro secolo* (vol. iii.), *Francesco Grillparzer* (Milan, 1893).

GRILSE, grĭls (Scotch also *gilse*, cf. Ir. *greal sach*, sort of fish). A British name for a young salmon, on its first return from the sea, when it weighs from two to six pounds.

GRIM. The fisherman who, in Arthurian legend, saves the youthful Havelok from a watery grave, rears him as his son, and with the royal reward of his good deed founds the town of Grimsby. The story is told in *The Lay of Havelok, the Dane.*

GRIM, THE COLLIER OF CROYDON. A play by an unknown author, printed in 1662, and signed I. T., taken from Machiavelli's *Marriage of the Devil.* The character of the Collier, which is found in Crowley's *The Collier of Croydon* (1550), and in Edward's *Damon and Pithias* (1571), is of only secondary importance in the play.

GRIM, GIANT. In Bunyan's *Pilgrim's Progress*, an ogre who threatens the safety of Christiana and her children, on their journey to the Celestial City, and is killed by Mr. Greatheart.

GRIMALDI, grē-mäl′dē. A celebrated family of Genoa, members of which were princes of Monaco for several centuries down to 1731. They were stanch supporters of the Guelph interests in Genoa and Italy generally, and opposed the Dorias and other Ghibelline families. The family claimed descent from Grimoald, the majordomus of the Neustrian King Childebert III. (695-711). The most eminent members of the Grimaldi family were: RANIERI, Admiral of France, who commanded a fleet in the service of Philip the Fair of France in 1304, defeating and making prisoner Guy of Flanders.—ANTONIO, distinguished in naval warfare in the early part of the fourteenth century. He was successful against Catalans, but in 1353 was completely defeated by Nicolò Pisani, commanding a Venetian and Aragonese fleet off the coast of Sardinia.—DOMENICO, like the others, distinguished at sea, especially in the battle of Lepanto, October 7, 1571. He became cardinal and Vice-Legate of Avignon, and was noted for his efforts to exterminate heresy.—GERONIMO (1579-1685), a cardinal, was celebrated for his attempt to reform the morals of the clergy. He founded a hospital for the poor, and distributed great sums in alms. In 1731 the male line of Grimaldi became extinct, and the Principality of Monaco passed to the kindred house of Goyon-Matignon, who assumed the name Grimaldi. Consult: Pierlas, *Monuments inédits sur les Grimaldi de Monaco* (Turin, 1885); Métivier, *Monaco et ses princes* (La Flèche, 1865); Saige, *Monaco, ses origines et son histoire* (Monaco, 1897).

GRIMALDI, GIOVANNI FRANCESCO (called IL BOLOGNESE) (1606-80). An Italian landscape painter of the Bolognese School, born in Bologna. He was a pupil of the Carracci. He worked in Rome under the patronage of Innocent X. and his successors, and in Paris under that of Cardinal Mazarin. He was twice president of the Academy of Saint Luke in Rome. He was one of the foremost landscape painters of his time, and also executed many etchings and drawings, some of which latter have been mistaken for those of Titian. His works in the manner of the Carracci include a series of landscapes in the Borghese Gallery, Rome, a series of scenes from the Old Testament in the Quirinal, Rome, several landscapes in the National Library, Paris, two in the Louvre, and a "Baptism of Christ" in the Darmstadt Museum.

GRIMALDI, Joseph (1779-1837). A well-known representative of the clown in English pantomime. His father was an actor of Italian parentage, and 'little Joe,' who was born in London, December 18, 1779, appeared when scarcely two years old at Sadler's Wells Theatre, where he regularly performed (except for one season) down to the date of his retirement from the stage, prematurely worn out by sheer hard work. For several months each year he used to perform nightly at two different playhouses, and once he achieved the feat of acting at three on the same night. At times he played in regular drama, but as a clown he was considered inimitable. His performance in the pantomime of *Mother Goose* (1806) was many times repeated. At the conclusion of his last appearance, which was as Harlequin Hoax, in his benefit at Drury Lane (1828), he made a pathetic but dignified farewell address. He died in London, May 31, 1837. Consult *Memoirs of Joseph Grimaldi*, edited by Charles Dickens (New York, 1838).

GRIMALKIN, grĭ-măl′kĭn (*gray* + *malkin*, cat). The quasi-personal name of a cat (properly the female). It is also the name of a familiar of one of the witches in *Macbeth*.

GRIMES, grīmz, Bryan (1828-80). A Confederate soldier, born in Pitt County, N. C. He graduated at the University of North Carolina in 1848, and became a planter in his native county. When the Civil War began he entered the Confederate service as major of the Fourth North Carolina Regiment, and served until the surrender at Appomattox. In the battle of Fair Oaks Grimes distinguished himself by his gallantry. He took part in the Maryland campaign in the fall of 1862, and at the battle of Fredericksburg commanded the Fifth Brigade in Gen. D. H. Hill's division of 'Stonewall' Jackson's corps. Later he fought at the battles of Chancellorsville and Gettysburg. On June 4, 1864, he was assigned to the command of Daniel's old brigade in Rodes's division of the Second Army Corps. In the fall of 1864 he had command of Rodes's old division, and accompanied Gen. Jubal A. Early during the Shenandoah Valley campaign. He received his commission as major-general on February 28, 1865, and took an active part in the last struggles of Lee's army. At the close of the war Grimes returned to his plantation in North Carolina. He was shot while driving along a country road near his home in Pitt County.

GRIMES, James Wilson (1816-72). An American politician and legislator, born at Deering, Hillsboro County, N. H. He graduated at Dartmouth College in 1836, and in the same year removed to Burlington, Michigan Territory, in what is now the State of Iowa. In this year the Iowa country was added to the newly erected Territory of Wisconsin, and Grimes, who had begun the practice of law, was appointed assistant Territorial librarian. He served also as secretary of a commission at Rock Island appointed to negotiate a transfer of lands with the Sac and Fox Indians, and after the organization of Iowa Territory in 1838 served several terms in its Legislature. In 1854 he became the nominee of both the Whig Party and Free-Soil Democratic Party for Governor of Iowa, and after an exciting campaign was elected. His administration, lasting until 1858, saw the birth of the Republican Party in Iowa. He was one of the earliest and most active workers in the formation of that party, and after leaving the Governor's chair was elected as a Republican to the United States Senate. He was a member of the Peace Convention of 1861. In 1864 he became chairman of the Committee on Naval Affairs, for the duties of which position he had particularly qualified himself. In 1865 he was reëlected for another term of six years, but served only until 1869, when, after a stroke of paralysis, he resigned. He was one of the few Republican Senators who voted for acquittal at the impeachment trial of President Johnson. The last two years of his life were spent in Europe. Consult Salter, *Life of James W. Grimes* (New York, 1876).

GRIMKÉ, grĭm′kâ, Thomas Smith (1786-1834). An American lawyer and reformer, brother of Angelina and Sarah Grimké. He was born in Charleston, S. C.; graduated at Yale in 1807; studied law, and attained eminence at the bar. From 1826 to 1830 he was a member of the State Senate, and then and later vigorously opposed South Carolina's nullification projects. He was one of the early advocates of temperance, and was an enthusiastic member of the American Peace Society. One of his hobbies was a reform in the spelling of the English language. He published *Addresses on Science, Education, and Literature* (1831).

GRIMKÉ SISTERS, The, Sarah Moore (1792-1873) and Angelina Emily (1805-79). American abolitionists, and advocates of woman's rights; sisters of Thomas Smith Grimké (q.v.). They were born in Charleston, S. C., where their father, John Faucheraud Grimké, was a prominent lawyer and large slaveholder. After his death the two sisters freed their slaves and removed to Philadelphia, Sarah going first in 1821, and Angelina following in 1828. Both joined the Society of Friends, and devoted themselves for several years to agitating the anti-slavery question in that city. In 1836 they removed to New York, where they were intimately associated with the leading spirits of the American Anti-Slavery Society, and during the subsequent winter they attracted considerable attention by delivering public lectures on slavery. At this time Sarah wrote an *Epistle to the Clergy of the Southern States*, which, like Angelina's previously published *Appeal to the Christian Women of the South*, was addressed to their old neighbors. In 1837 they went to Boston, where Sarah lectured on woman's rights, a subject which had begun to interest her in New York, and published in the *New England Spectator* a series of letters on *The Province of Woman*. The next year Angelina married Theodore D. Weld (q.v.), one of the leaders of the Anti-Slavery Society, and, accompanied by Sarah, they went to live at Belleville, N. J., where they remained until 1854, when they established a large coeducational institute at Eagleswood, near Perth Amboy, N. J., which became noted for the independent and enlightened spirit pervading it. Both of the sisters died at Hyde Park, near Boston. Consult Birney, *The Grimké Sisters, Sarah and Angelina Grimké* (Boston, 1885).

GRIMM, grĭm, Friedrich Melchior, Baron von (1723-1807). A noted French journalist and member of the Encyclopædist Circle. He was born in Ratisbon, Germany, of poor parents, and

studied at Leipzig. His first production was a tragedy, which was ridiculed at once by the audience and by the critics. Disappointed, he went to Paris as a tutor, and remained there as a reader to the Crown Prince of Saxe Gotha. In 1749 common musical tastes won him the friendship of J. J. Rousseau, and by him he was introduced to the Encyclopædist Circle. Soon afterwards he became secretary to Count Friesen, nephew of Marshal Saxe, and so found an entry into the brilliant social circles of Paris, where his intelligence, wit, tact, and good manners soon made him a general favorite. He became wholly French in spirit, and was naturalized. His literary reputation was won by a pamphlet, *Le petit prophète de Boehmischbroda* (1753), on the merits of Italian and French opera, a society question of the hour, but his fame dates from the *Correspondance littéraire, philosophique et critique*, begun in 1753, and carried on with various assistants and substitutes until 1759, in the name of Abbé Raynal, who had originated the idea, and then in Grimm's own till 1790. In 1754 Rousseau introduced Grimm to Madame d'Epinay. She soon came to prefer him to the older and intractable lover who left in his *Confessions* a false account of the matter that injured Grimm's reputation for several years. He served as secretary of the Marshal d'Estrées during the Westphalian campaign (1756-57), and was afterwards Minister of Saxe-Gotha at the French Court. In 1773 he visited Saint Petersburg on a diplomatic mission. The Revolution drove him from France, first to Gotha, then to Saint Petersburg, where he resided from 1792 to 1795, and enjoyed the favor of Catharine II., and whence he was sent as Russian Minister to Hamburg, his last public office. Grimm's *Correspondance* was not published till 1812. It was sent to several sovereigns and to some minor German courts, and made accessible to them, through a sort of secret official organ, the ideas of the French philosophic movement, shrewdly seasoned to the liking of princes, who were induced to see in the new 'philosophy' a means of consolidating their power. Thus Grimm was able to contribute very essentially to the spread of the Encyclopædic movement, and to prepare the way for introducing the emancipatory ideas of the French Revolution. And besides this, the *Correspondance* is a literary review and chronicle—a record of an important literary period of almost unique value. His collaborators, especially Diderot and Madame d'Epinay, carried on the work in his own delicate, subtle, impartial, and profoundly skeptical spirit. The *Correspondance* was first published in seventeen octavo volumes (1812-14), better edited by Taschereau (15 vols., 1829-31, with a supplement of *Correspondance inédite*). Grimm's *Mémoires* on his relations with the Empress Catharine have been published by the Russian Historical Society. For a critical literary appreciation, consult: Sainte-Beuve, *Etudes sur Grimm* (Paris, 1854); id., *Causeries du Lundi*, vol. vii. (ib., 1857-62); and Schérer, *Melchior Grimm* (ib., 1887).

GRIMM, Hermann (1828-1901). A German author, a son of Wilhelm Karl Grimm. He was born at Cassel, and was educated in Berlin and Bonn. In 1872 he was appointed to the chair of art history at Berlin University, and subsequently published his lectures as a biography of Goethe (5th ed. 1894). His other works include: *Demetrius*, a drama (1854); *Novellen* (2d ed. 1862); *Essays* (3d ed. 1884); *Fünfzehn Essays, neue Folge* (4th ed. 1890); *Unüberwindliche Mächte*, a novel (2d ed. 1870); and the excellent biography entitled *Leben Michelangelos* (7th ed. 1894).

GRIMM, Jakob Ludwig Karl (1785-1863). An eminent German philologist and antiquary, born January 4, 1785, at Hanau, in Hesse-Cassel. He was educated in philology and law at Marburg, and afterwards visited Paris, where he pursued a variety of studies, and cultivated his taste for mediæval literature. On his return to Germany he was employed in the office of the Minister of War at Cassel, and became successively librarian to the King of Westphalia and auditor to his Council of State. In 1814 he was secretary to the Ambassador of the Elector of Hesse at Paris, and attended in a similar capacity the Congress of Vienna. While in Paris he claimed, by order of the Prussian Government, the restoration of valuable manuscripts which had been removed to Paris by the armies of Napoleon I. In 1829 he, jointly with his brother Wilhelm, received the appointment of professor of German literature and librarian of the University of Göttingen. The brothers were among the seven professors who protested in 1837 against the abolition of the Constitution by the King of Hanover, for which act they were outlawed and obliged to retire to Cassel. In 1841 both were invited to Berlin, where as members of the Academy they were entitled to give lectures. Jakob was in 1848 elected member of the Frankfort Parliament. He was, however, with all his interest in political affairs, averse to party strife, and his life was devoted to philological and antiquarian studies. His German *Grammar*, in four volumes, the first volume of which was published in 1819, and the last in 1837 (4th ed. 1870-98), is one of the greatest philological works of the age, and may be said to have laid the foundation of the historical investigation of language. His *Deutsche Rechtsalterthümer* (1828) and *Deutsche Mythologie* (1835) are exhaustive works upon the society of the Middle Ages in Central Europe, and the religious traditions and superstitions from the earliest times. His *Geschichte der deutschen Sprache* (1848, 4th ed. 1880) and *Ueber den Ursprung der Sprache* (1851) are also works of great importance. In company with his brother Wilhelm he published numerous works of a more popular character, the best known of which is *Kinder-und Hausmärchen*. The greatest joint undertaking of the two brothers (now carried on by other scholars) is the *Deutsches Wörterbuch*, begun in 1852. Jakob Grimm died September 20, 1863.

GRIMM, Ludwig Emil (1790-1863). A German painter and engraver, brother of the preceding, born at Hanau. He studied under Karl Hess at Munich. In 1813 he fought in the War of Liberation, and then returned to Munich to renew his studies. In 1832 he was made professor at the Academy of Cassel. He painted portraits and some religious pictures, notably a "Madonna and Saints" (1818); but his most artistic work was as an engraver. A portrait of Melanchthon, after Cranach, and some small genre studies from his own designs, are remarkable for purity of line. He published collections of his engravings in 1823, 1840, and 1854.

GRIMM, Wilhelm Karl (1786-1859). A German philologist, brother of Jakob Grimm. He was born at Hanau, February 24, 1786. He was the companion of his elder brother at the Lyceum of Cassel and the University of Marburg. In 1814 he was secretary of the librarian of Cassel, and on removing to Göttingen in 1830 was appointed assistant librarian under his brother, and in 1831 professor extraordinary in the philosophical faculty. He joined his brother in the protest against the King of Hanover, shared his exile, and also his call to Berlin. They labored together in the *Wörterbuch*, the *Marchen*, and many other works, and were commonly known as the Brothers Grimm. Among the works of the younger Grimm are: *Altdanische Heldenlieder* (1811), a translation; *Altdeutsche Walder* (1821); and *Die deutsche Heldensage* (1829). He died December 16, 1859.

GRIMMA, grim'mà. A town of Saxony, Germany, situated in a hollow near the left bank of the Mulde, about 19 miles southeast of Leipzig (Map: Prussia, E 3). The vicinity is very picturesque, and the town is well laid out and attractive. The Church of Our Lady dates from the thirteenth century. The old electoral castle is now used for public offices. The town hall dates from 1442. Chief among the educational institutions of the town is the Fürstenschule, consecrated in 1550, and occupying since 1892 a new building. In the vicinity of the town are found the ruins of the thirteenth-century convent to which Katharina von Bora, Luther's wife, once belonged. Grimma was once noted for its textiles, which have since given place to iron products, machinery, leather, etc. Population, in 1890, 8957; in 1900, 10,892. Grimma is first mentioned as a town in 1065.

GRIMMELSHAUSEN, grim'mels-hou'zen, Hans Jakob Christoffel von (c.1625-76). A German writer. He was a peasant's son, and was born in Gelnhausen. His important *Simplicissimus* is the only German fiction of the seventeenth century that can still be read with pleasure. He served as a soldier through the later period of the Thirty Years' War, when, able to observe the traits of the common people, he thus provided himself with ample material for his future studies in fiction. From Protestantism he turned late in his life to Catholicism, and served for a time the Bishop of Strassburg. For a while, too, he was a magistrate at Renchen, in Baden, where he died. *Der abenteuerliche Simplicissimus Teutsch* (1669) is, as its subtitle states, "The Description of the Life of a Strange Vagabond Named Melchior Sternfels von Fuchshaim." It is a direct imitation of the Spanish *picaresque* novels, as well as a wonderfully realistic narrative drawn from the author's own experiences. No contemporary writing gives a more vivid realistic picture of the desolation wrought in Germany from 1618 to 1648. At the same time he exhibited very marked talents as a prose poet. He put forth many other books of different genres and of much less general significance. Among them were satirical productions such as *Schwarz und weiss, oder Die satirische Pilgerin* (1666); gallant romances of the kind that were the mode in that day, as, for instance, *Dietwalt und Amelinde* (1670); and popular stories based on biblical subjects, one of which was entitled *Joseph* (1667). There are good modern editions of *Simplicissimus* by Keller (Stuttgart, 1852-62) and Tittmann (Leipzig, 1877), and a reprint edited by Kögel (Halle, 1880).

GRIMM'S LAW. A phonetic law stating the changes, commonly termed the first and second sound-shiftings, undergone by the mutes or explosives of the Indo-Germanic consonant-system in the Low and High Germanic languages respectively. The law, which is one of the most important of all phonetic laws (see Phonetic Law), was first developed by Jakob Grimm (q.v.), who outlined it in a letter to Lachmann, November 25, 1820, and in the second edition of his *Deutsche Grammatik* (1822), although the Danish scholar Rask (q.v.) had enunciated its main phenomena in 1819. The law is of much importance in the history of philology (q.v.) as having furnished one of the basal arguments in favor of the theory of the invariability of phonetic law. The fact that there are many words which seem to violate Grimm's law, but which are explained by Verner's law (q.v.) and Grassmann's law (q.v.), is a confirmation of this theory, for it is evident that many linguistic phenomena which are still obscure are probably due to the action of laws which have not yet been discovered. The law of Grimm concerns the mutes, comprising the tenues, mediæ, and mediæ aspiratæ (the tenues aspiratæ being rare and in many cases extremely doubtful) of the Indo-Germanic palatal, velar, and labialized velar series (all combined into palatals in Germanic), *k̑, ĝ, ĝh, q, q, qh, qᵘ, gᵘ, gᵘh;* dentals, *t, d, dh;* and labials, *p, b, bh.* The law in its most general terms may be stated as follows: Indo-Germanic tenues become the corresponding aspiratæ in Low Germanic, and remain unchanged in High Germanic; Indo-Germanic mediæ become the corresponding tenues in Low Germanic and affricatæ in High Germanic; Indo-Germanic mediæ aspiratæ become mediæ in Low Germanic and tenues in High Germanic. Representing, for convenience, the Indo-Germanic palatals, velars, and labialized velars as simple palatals, the following table may be constructed to make the definition clear:

	I.G.	L.G.	H.G.
Tenues	*k*	*h*	*h*
	t	*th*	*th(d)*
	p	*f*	*f*
Mediæ	*g*	*k*	*ch(k)*
	d	*t*	*z*
	b	*p*	*pf*
Mediæ aspiratæ	*gh*	*g*	*k(g)*
	dh	*d*	*t*
	bh	*b*	*p(b)*

It is evident from the table that the changes are more uniform in Low Germanic than in High Germanic. The various Old High German dialects stand in this respect in different stages of development, as is described in German Language. The dialect which has carried out the High Germanic change most thoroughly is the Alemannic, e.g. *thri*, Ger. *drei*, three; *chneo*, Ger. *Knie*, knee; *kot*, Ger. *Gott*, God; *pruader*, Ger. *Bruder*, brother. As examples of Grimm's law, citations may be made of Indo-Germanic words present in Sanskrit, Greek, Latin, Gothic, English, Old High German, and New High German.

There are certain exceptions in addition to those already indicated in the table. Thus, after *s*, the tenues remain unchanged (compare *sty* and its cognates given below; the Indo-Germanic combination *pt* becomes Germanic *ft*, and *kt*,

qt, *q̂t* become *ht* (Gk. κλέπτης, thief, Goth. *hliftus*; Skt. *nakti*, night, Goth. *nahts*), while q^u and q^uh have a more complex development than can be outlined here.

	Skt.	Gk.	Lat.	Goth.	Eng	OHG.	Ger.
k	*kampatē*	κώπη	*capere*	*hafjan*	*heave*	*hefan*	*heben*
t	*trayas*	τρεῖς	*tres*	*þreis*	*three*	*drī*	*drei*
p	*pad*	πούς	*pes*	*fōtus*	*foot*	*fuoz*	*Fuss*
g	*jānu*	γόνυ	*genu*	*kniu*	*knee*	*kniu*	*Knie*
d	*damayati*	δαμάν	*domare*	*ga-tamjan*	*tame*	*zamjan*	*zähmen*
b	.....		*tribus*	*þaúrp*	*thorp*	*dorf*	*Dorf*
gh	*stighnōti*	στείχειν	.....	*steigan*	*sty*	*stīgan*	*steigen*
dh	*rudhira*	ἐρυθρός	*ruber*	*rauds*	*red*	*rōt*	*rot*
bh	*bhrātar*	φρατωρ	*frater*	*brōþar*	*brother*	*bruoder*	*Bruder*

The cause of both sound-shiftings has been explained as an increase in the speed of utterance, but this theory is open to many objections. The change seems to be due in reality to an increased force of expiration of the vocal current. Thus it is evident experimentally that an increased stress on a media or sonant will produce a tenuis or surd, as in the emphatic pronunciation of such a word as 'Gad!' and in like manner emphatic aspiration, as in the change of *t* to *th*, is a recognized phonetic phenomenon. It is noteworthy that changes to some extent analogous to the operation of Grimm's law are found in other languages. Thus in the Bantu group of South Africa a similar change may be observed, and among the Indo-Germanic dialects the Armenian (q.v.) is conspicuous for its change of the old tenues to mediæ, and of the old mediæ to tenues (e.g. Old Armenian *p*, *d* = New Armenian *b*, *t*).

Chronologically the first sound-shifting seems to have been carried out between B.C. 500 and 250. It began with the change of the tenues to tenues aspiratæ, which then became, as in Greek, voiceless spirants (e.g. *t* became *th*, then *þ*). The second change was that of the Indo-Germanic mediæ aspiratæ to voiced spirants, and then to mediæ (e.g. *dh* became *δ*, then *d*). This was accomplished less uniformly than the first change, so that *g* long retained its spirant value. Verner's law (q.v.) seems to have come into operation at this period. The third change was that of the Indo-Germanic mediæ to tenues. The second or High Germanic sound-shifting apparently took place between the fifth and seventh centuries. The earliest was that of the voiceless *þ* to the voiced *δ*, whence came *d*. This began in the Oberdeutsch dialects Alemannic and Bavarian, spread to the Middle Frankish, and finally included the Niederdeutsch group of Lower Frankish and Saxon. The other changes of the second sound-shifting followed, with the limitations already noted, the same geographical course. See GERMAN LANGUAGE; PHONETIC LAW; PHONETICS; VERNER'S LAW.

GRIMS'BY, GREAT. A seaport and market-town in Lincolnshire, England, on the Humber, 20 miles east-southeast of Hull (Map: England, F 3). The town consists of two portions, the older with irregular streets, and the new, to the east, spacious and regularly laid out. The chief buildings are the fine old parish church, the town hall, custom-house, corn exchange, free grammar school, mechanics' institute, and the dock warehouses. The town provides a school for technical instruction, owns the market and much remunerative leasehold and real estate. It has an electric-lighting and power plant. It is chiefly famous for its immense fishing trade, but has ship-building works, breweries, tanneries, flax-dressing and bone-crushing mills, and manure works. Its harbors and docks cover 350 acres. As the terminus of the Manchester, Sheffield and Lincolnshire and the East Lincolnshire railways, it exports the manufactures of west Yorkshire and Lancashire. It imports the raw and manufactured products of Russia, Denmark, Norway, and Germany. The total annual value of its imports and exports during the five years ending in 1900 exceeded £18,500,000 ($92,500,000). An average of 2000 vessels enter and clear a gross tonnage of 2,225,000 annually. Grimsby takes its name from Grim, a fisherman of Arthurian legend. It has numerous tumuli and Roman remains, and is the traditional spot where the Danes first invaded England. It received its charter of incorporation from King John, and further charters from Edward I. and Edward III. It sent eleven ships to assist Edward III. in his expedition against Calais (1346). The silting of the harbor led to its decline, but prosperity revived with the harbor improvements of 1849-58. Population, in 1891, 61,750; in 1901, 81,150. Consult Shaw, *Old Grimsby* (Grimsby, 1897).

GRIMSEL PASS. A pass of the Bernese Alps, Switzerland (see ALPS), leading from Italy and Southern Switzerland into the Hasli Thal or Upper Valley of the Aar, and forming the boundary between the cantons of Bern and Valais. The victory of the French, whose advance from the Hasli Thal in 1799 was opposed by the Austrians, is commemorated by the Todtensee, 'Lake of the Dead.'

GRIM'SHAW, ROBERT (1850—). An American civil engineer and author. He was born in Philadelphia, Pa., and became a lecturer on physics at the Franklin Institute of that city. Among his best-known works are: *Saws* (1880); *Steam-Engine Catechism* (1885-87); *Hints on House-building* (1889); *Hints to Power-users* (1891); *Record of Scientific Progress* (1891); and *Fifty Years Hence* (1892). He was also one of the editors of the *Standard Dictionary*.

GRIM'STON, W. H. See KENDAL, MR.; KENDAL, MRS.

GRIM'WIG. A kindly but very positive old gentleman, in Dickens's *Oliver Twist*. He is a warm friend of Mr. Brownlow, and enforces his own opinions by threatening to 'eat his head' if they prove false.

GRIN'DAL, EDMUND (c.1519-83). An English prelate, born near Saint Bees, Cumberland. He graduated at Cambridge in 1538, became private chaplain to Bishop Nicholas Ridley, and in 1541 chaplain to Edward VI. He succeeded Bonner in 1559 as Bishop of London. His leniency toward the Puritans did not further the

establishment of the Anglican system, and he was transferred to the See of York in 1570. On the death of Archbishop Parker, Queen Elizabeth favored his accession to the See of Canterbury, to which he was elected in 1575. The Queen had counted on his tractability, but was disappointed to find him rigidly conscientious. He was sequestered in 1577, and was not fully restored for five years. His writings, and a life by the Rev. William Nicholson, were published by the Parker Society in 1853.

GRINDELWALD, grĭn'del-vält. One of the most beautiful valleys of the Bernese Alps, situated in the eastern part of the Canton of Bern (Map: Switzerland, C 2). It is celebrated for its glaciers, the Lower Grindelwald descending lower than any other of the Alpine glaciers. Grindelwald is a favorite winter resort. The village is situated at an altitude of about 3500 feet, and has a number of hotels. Its population was 3370 in 1900.

GRINDER (from *grind*, AS. *grindan;* ultimately connected with Lat. *frendere*, to gnash). A small Australian flycatcher (*Sisura inquieta*) which, besides its ordinary whistle, produces a sound resembling that made by a scissors-grinder's machine. This sound is made while the bird hovers in the air (its whole manner of flight is remarkable), but how it is produced is not known.

GRINDING. The operation of shaping or smoothing any hard substance by rubbing away its surface with a rough stone or with a cutting powder. It is similar to filing, and is used in cases where, from the hardness of the material, or for other reasons, filing is inapplicable. Thus cutting tools and other steel instruments may be filed before hardening and tempering; but after this, if further abrasion is required, they must be ground. Glass lenses and metal specula are ground into shape with emery-powder laid upon a metal tool. Ornamental glass is ground into facets or otherwise by means of stones and lap-wheels. Diamonds and other gems are ground or cut with diamond-dust imbedded in soft iron. When large flat surfaces are required, they are obtained by first working two pieces of the substance nearly flat, and then laying one upon the other, and grinding their surfaces together with sand, emery, or other suitable cutting powder. Plate glass is finished in this manner; also surfaces of cast iron where accurate fitting is required, the iron surface being either prepared with a planing-machine or by turning in a lathe. Sockets and other bearings which require to be fitted with great accuracy are usually finished by grinding together. For brass and bell-metal powdered pumice-stone is best adapted for such purposes, as emery is liable to imbed itself in the metal and give it a permanent cutting action upon the bearings. *Dry grinding* is the term applied to the grinding of steel with dry grindstones. Its principal applications are in the grinding of the points of needles and forks, the surfaces of gun-barrels, and in finishing steel pens. See GRINDING AND CRUSHING MACHINERY; CUTLERY.

GRINDING AND CRUSHING MACHINERY. Under this head are included various forms of apparatus for reducing hard or fibrous substances to fragmentary form or to fine powder. Generally speaking, crushing machines are employed for performing the coarse reduction, and apparatus for producing a fine powder or flour is termed grinding machinery. The two classes merge into each other, but it will add to clearness of treatment in some respects to consider them separately in this article.

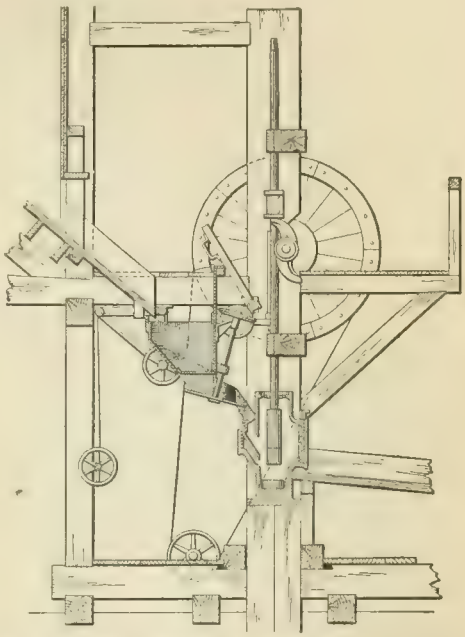


FIG. 1. VERTICAL SECTION OF STAMP MILL FOR CRUSHING GOLD ORE.

CRUSHING MACHINERY. Perhaps the earliest form of crushing machine is the *stamp* or *stamp mill*, which is now so extensively employed in reducing gold, copper, and other ores. Briefly described, a stamp mill consists of one or more stamps beneath which the ore is fed in a thin stream. Each stamp consists of a stem carrying at its lower end a head of chilled cast iron and arranged to work vertically up and down between guides. To produce the vertical movement there is a bracket or lug attached to the stem with which a cam or series of cams mounted on horizontal shafting engages, and thus raises and releases the stamp. In reducing ores stamps are usually operated in batteries or groups. Stamp mills perform either coarse or comparatively fine crushing, according as the rate of feed is fast or slow. Sometimes positive pressure stamps are employed in place of gravity stamps. *Roll crushers* are another important type. In them the material to be crushed is passed between two or more vertical rolls which may or may not have corrugated surfaces. Sometimes the rolls are designed to have a slipping action with reference to each other. Roll crushers are used in crushing sugar-cane and other fibrous materials particularly. *Edge-runner* crushers are usually employed in crushing seeds for oil. Generally they consist of a vertical axle which carries two or more radial arms, on the ends of which are journaled heavy metal wheels with broad tires or edges. These wheels through the rotation of the vertical axle travel round and round in a circular track on the bottom of a

shallow pan, into which the materials to be crushed are thrown. The crushing is done by the heavy wheel passing over the material. *Jaw crushers*, or *reciprocating crushers*, are one of the kinds most commonly used. They consist of two jaws, one fixed and one movable, so arranged as to form a V-shaped opening between them. This V-shaped jaw is not closed at the bottom, and one of the jaws is hinged at the top and so connected with suitable mechanism that it is alternately pushed toward and drawn away from the fixed jaw, thus alternately enlarging and reducing the V-shaped opening between the two. The material to be crushed, stone or ore, is inserted into the top of the jaw opening and is crushed by the reciprocating motion of the movable jaw until fine enough to run out of the bottom opening.

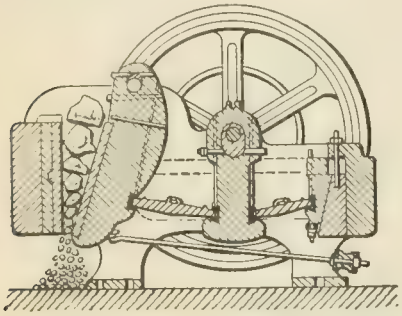


FIG. 2. VERTICAL SECTION OF JAW CRUSHER FOR STONE.

Gyratory crushers consist in respect to the crushing elements of an inverted hollow frustum of a cone, inside which an upright frustum of a solid cone receives a gyratory motion from a vertical shaft hinged at the top and connected with suitable propelling mechanism at the bottom. The material is crushed in the annular

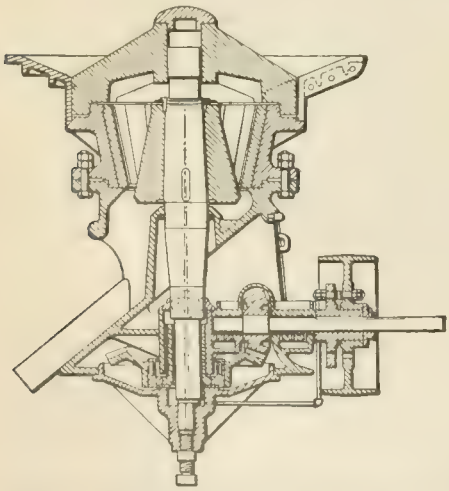


FIG. 3. VERTICAL SECTION OF GYRATORY CRUSHER FOR STONE AND ORES.

opening between the walls of the two frustums of cones. A *coffee-mill crusher* resembles a gyratory crusher except that the solid as well as the hollow frustum is inverted and is separated by a vertical shaft which has simple rotary motion without gyration.

Sausage-mill crushers consist of a longitudinal shaft carrying radial teeth working inside a cylindrical shell, from whose inner surfaces project radial teeth between which the shaft teeth mesh during revolution. All of these principal types of crushers are made in several forms, for each of which special qualities are claimed by the manufacturers. Stamp mills are almost exclusively used for crushing metal-bearing ores: roll and edge-runner crushers for crushing fibrous materials; and jaw and gyratory crushers for crushing ores, rock, cement, phosphate, and similar hard materials.

GRINDING MACHINES. In many processes crushing is simply a preliminary process to grinding to powder or flour. The machines for grinding are necessarily of a different character,

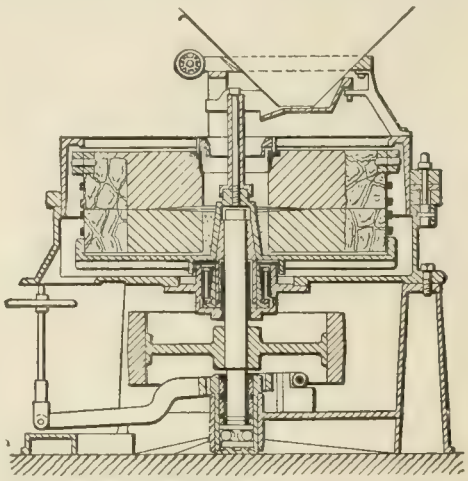


FIG. 4. VERTICAL SECTION EMERY STONE MILL FOR FINE GRINDING.

and are usually of less massive construction. Grinding machines are commonly called mills, and this term will be used here. The first form of real grinding machine was, perhaps, the *millstone mill*, and this still remains one of the most common forms in use to-day. A millstone mill consists of two circular stones set face to face, one of which revolves on a vertical axis, while the other is fixed. Usually the upper stone is the movable one or runner, and has a hole at the centre through which the material to be ground is fed, and after being subjected to attrition between the two stones emerges at the edges of the two stones and falls into a receiver below. The grinding faces of the two stones are dressed into grooves and ridges of various forms and arrangements to facilitate the grinding and the movement of the powder toward the edges of the stone.

Sometimes the lower stone is made the runner, and for special purposes the stones are set vertical instead of horizontal. Millstone mills are extensively used in grinding grain, cement, phosphate rock, etc. *Ball mills* are of two principal types; in one type balls of comparatively large size travel around a fixed track in a definite path; in the other the balls are loose in a rotating drum. Usually the balls are of hardened steel, but in some forms of mills flint

pebbles are substituted for metal balls. In the first type of ball mills named the material is fed to the mill so as to be ground between the traveling balls and the path on which they travel; in the second type the material and balls are introduced together into the rotating drum, and the grinding is done by the constant movement and fall of the balls. The inside of the drum is provided with a hard lining to withstand wear. Ball mills are used chiefly for grinding cement, clinker, phosphate rock, etc.

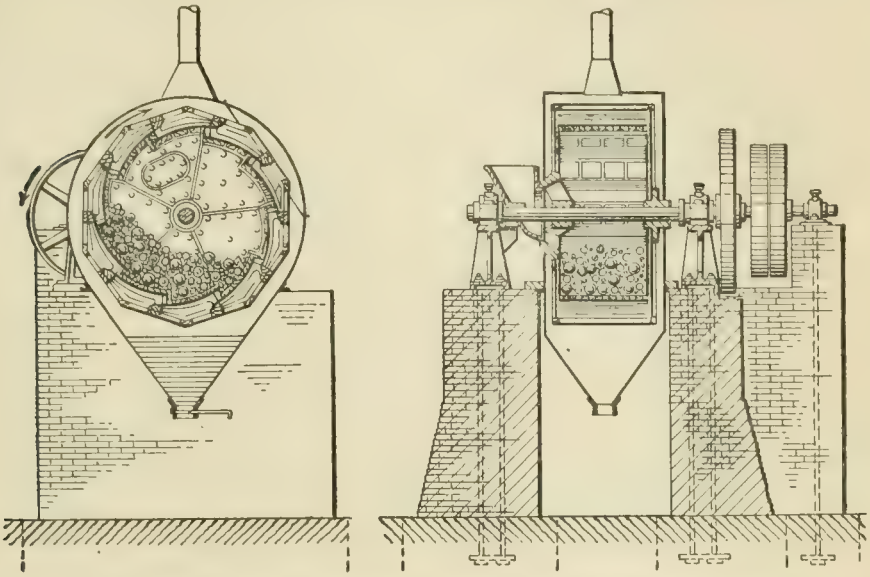


FIG. 5. TRANSVERSE AND LONGITUDINAL SECTIONS OF BALL MILL FOR FINE GRINDING.

Rolls and edge-runner mills are also used for grinding as well as for crushing. A form of edge-runner mill much used in grinding cement is the *Griffin mill.* The pulverizing roll is attached to the lower end of a shaft which is suspended by a universal joint within a horizontal pulley. Above the roll on the shaft is a fan and on the bottom of the roll are plows or stirrers, which agitate the material being ground. Four standards support the grinding mechanism proper. The clinker enters a hopper from which it is carried by a screw feed into the pan, which is surmounted by a ring-shaped die or bearing surface for the roll. The shaft carrying the roll revolves with the pulley, and being hung so as to swing free, the centrifugal force brings the edge of the roll hard against the die, so that it revolves on the shaft in a reverse direction to the rotation of the shaft. Where a quantity of material to be reduced has been fed into the mill sufficient to fill the pan as high as the plows on the lower side of the roll, they work it in, stir it up, and throw it against the die so that it is acted upon by the roll.

The *coffee-mill* type of grinding machine is commonly employed for grinding bark, spices, dry paint, and similar easily crushed substances. This form of mill consists of a conical-shaped runner rotated by a vertical shaft inside a cone-shaped casting. The grinding surfaces of such mills are usually of cast iron, and are corrugated or ribbed to facilitate the grinding action. One of the most ingenious, simple, and effective mills in use was the invention of James Bogardus, of New York City. Two wheels, having on their faces concentric grooves, have different axes of revolution, being eccentric, whence the mill derives its name. The wheels are placed horizontally, and the lower one is turned by a shaft at the rate of from 600 to 800 revolutions per minute. The upper wheel also takes on a motion from the impulse of material brought against it, but being eccentric, the material is brought diagonally against the edges of the groove, making the grinding very effective and preventing clogging. Over 200 barrels of sugar have been ground per hour in a 16-inch mill. It will grind 5 tons of oil-cake, half a ton of bark, 2 tons of white lead in oil, 4 tons of iron ore, or 2 tons of other ores per hour. It is very strong and not easily disordered. Grinding machines for shaping and polishing metals, glass, etc., are referred to under GRINDING. See also FLOUR.

GRIN'DLE. One of the many quaint local names, more fully 'John A. Grindle,' given in the Southern Mississippi Valley to a strange fish, the mudfish (*Amia calva*), elsewhere described under BOWFIN.

GRINDSTONE. A flat, circular stone made to revolve upon an axis, and used for grinding steel, glass, and other stones, etc. Grindstones are of various degrees of coarseness, according to the purpose for which they are to be used. Grindstones are usually mounted more or less simply, but the large stones employed in cutlery manufacture are turned by machinery at a speed as great as practicable without bursting the stone by the centrifugal force. Grindstones are commonly made of a siliceous sandstone, in which the grains are sharp and there is little cement to bind them together. The surface is thus prevented from wearing smooth. Some of the best grindstones in the United States come from Berea, Ohio, and are obtained from certain layers of the Carboniferous sandstone or Berea grit. Artificial grindstones of very uniform and per-

feet texture are made from emery (q.v.); they are much used for work on metal surfaces, dispensing with slow and laborious hand filing. Emery wheels are made as large as three feet in diameter, and so strong that they can be driven at 6000 feet per minute, when they will readily cut tempered steel. Grindstones are now also being made of carborundum, which ranks next to the diamond in hardness. These are coming into large use for cutting and polishing precious stones. See MILLSTONE; ABRASIVES.

GRIND'STONE ISLAND. (1) An islet of Albert County, New Brunswick, Can., in Chignecto Bay (Map: Nova Scotia, G 2). It takes its name from its quarries of grindstone, of which large quantities are exported to the United States. (2) One of the Magdalen Islands (q.v.).

GRINGO, grĭn'gō (Sp., gibberish, possibly a popular variation of *Griego*, Greek). A contemptuous term applied to an American or Englishman by Mexicans and South Americans.

GRINGOIRE, grăn'gwär', or **GRINGORE,** grăn'gôr', PIERRE (1475?-1544). A French poet and dramatist of the Court of Louis XII., born at Caen. As a poet he began by putting forth moral allegories. He was first to use the stage for contemporaneous political satire. He was a leading member of the theatre company known as *Enfants sans souci*, in Paris, and took a conspicuous part in the production of mysteries. His most noted topical drama, in which King Louis XII. himself is said to have taken a hand, is *Le jeu du prince des sots* (1511), directed against Pope Julius II. This and *Le mystère de Saint-Louis* (about 1525) were his most important creations, the former illustrating the full development of the mediæval type of play, with its coarse, farcical morality. Gringoire was distinguished for his dry wit and clever vivacity. He finally went into the service of the Duke of Lorraine, and in his latter days wrote religious or spiritual poetry. His *Œuvres* were brought out in Paris in 1858-77. Victor Hugo made Gringoire an interesting character in *Notre Dame de Paris*. Banville also made of him a leading figure in a comedy called *Gringoire* (1866). In both cases, however, the authors had little regard for the true character of the poet or the facts in connection with his career. Consult: Picot, *Gringoire et les comédiens italiens* (Paris, 1878); and Badel, *Pierre Gringoire, poète français* (Nancy, 1893).

GRINNELL, grĭn-nĕl'. A city in Poweshiek County, Iowa, 55 miles east by north of Des Moines, on the Chicago, Rock Island and Pacific and the Iowa Central railroads (Map: Iowa, E 3). It has manufactures of gloves and carriages, and is the seat of Iowa College (Congregational), opened in 1848. Grinnell is governed under the charter of 1882, which provides for a mayor, elected biennially, and a unicameral council. The city owns and operates its water-works. Settled in 1854, Grinnell was incorporated in 1865, and in 1882 was chartered as a city of the second class. In that year it suffered from a disastrous cyclone. Population, in 1890, 3332; in 1900, 3860.

GRINNELL, HENRY (1799-1874). An American merchant, born in New Bedford, Mass., and educated at the academy in that place. In 1818 he removed to New York, where he began a mercantile career. In 1826 he became a member of the firm of Fish & Grinnell, in which an elder brother was a partner, and in 1828 became head of Grinnell, Minturn & Co., which for over thirty years was one of the most prosperous shipping firms in the country. He retired from active business in 1852, although in later life he was interested in the insurance business. He will be longest known for his interest in polar expeditions. His first connection with such an enterprise was in 1850, when he fitted out an expedition to go in search of Sir John Franklin, from whom nothing had been heard for five years. This expedition, under command of Lieut. E. J. De Haven, accompanied by Dr. Elisha Kent Kane as surgeon, passed through Davis Strait and Baffin Bay, reaching a latitude of 75° 24′ 21″, where hitherto unknown land, which was named Grinnell Land, was discovered. In 1853, with George Peabody, Grinnell fitted out a second Franklin relief expedition, which, under Dr. Kane, sailed as far north as 78° 43′, and added greatly to the geographical knowledge of the coast of Greenland. Grinnell also contributed to the Hayes expedition of 1860, and the *Polaris* expedition of Captain Hall in 1871. He was one of the founders and first president of the American Geographical Society in 1852, and its honorary vice-president from 1854 to 1872.

GRINNELL LAND. A vast region in the Arctic Ocean, situated west of Greenland, from which it is separated by the Kennedy Channel. Its northern part is known as Grant Land, and in the south it is continuous with Ellesmere Land (Map: North America, L 1). Its valleys are free from snow during the summer, and covered with arctic poppy and moss. The fauna of the region includes the musk-ox, wolf, fox, hare, lemming, and the ermine. Grinnell Land was discovered by Lieutenant De Haven in 1850, and named after Henry Grinnell (q.v.). It was explored by the British expedition under Nares in 1875-76, and by Greely in 1881. It was also visited by Lockwood in 1882, and by Peary in 1898-99.

GRIP. A raven of great sagacity in Dickens's *Barnaby Rudge*. He is a great friend and companion to the title character, and is possessed of remarkable and vigorous powers of speech. His original was a pet of the author's.

GRIPE (from *gripe*, AS., OS. *grīpan*, Goth. *greipan*, OHG. *grīfan*, Ger. *greifen*, to seize; connected with Lith. *greibti*, to seize). In a wooden ship, a timber bolted to the stem and keel at the place where the two join. A vessel sailing close-hauled gripes when she has a tendency to come up into the wind despite the action of the helm. It is caused by insufficient head sail, too much after sail, or improper trim; if the latter, she is too much down by the head, which may be corrected by shifting ballast from forward aft. A slight tendency to gripe is desirable, as it makes a ship tack easily and surely. Broad bands of plaited rope or canvas used for securing boats at the davits are also called gripes; they pass partly around the boat, and have the ends lashed to the rail or strong-back on the davits.

GRIPE, Sir FRANCIS. The avaricious guardian of Miranda, in Mrs. Centlivre's comedy *The Busybody*, who attempts to marry his ward for her money, but is outwitted by Sir George Airy.

The character doubtless owes much to Molière's Sganarelle.

GRIPPE (Fr. *la grippe*). An infectious disease characterized by fever, catarrhal affections of the respiratory and digestive systems, and nervous disorders. See INFLUENZA.

GRIQUALAND (grē'kwä-lānd) **EAST.** An eastern district of Cape Colony, South Africa, bounded northeast by Natal, southeast by Pondoland, south by Tembuland, west by Barkly East, and northwest by Basutoland (Map: Cape Colony, N 7). Area, 7594 square miles. Population, in 1891, 152,618, including 4150 whites. Since 1875 it has been a dependency under the jurisdiction of Cape Colony. Capital, Kokstad, named after Adam Kok, a Griqua chief, who migrated to the district with 15,000 Griquas, a hybrid race of Dutch and native origin.

GRIQUALAND WEST. A northern district of Cape Colony, South Africa, bounded north and west by Bechuanaland, east by the Orange River Colony, and south by the Orange River (Map: Cape Colony, H 5). Area, 15,197 square miles. Population, in 1891, 83,375, including 29,670 whites. It is famous for its diamond-fields, discovered in 1867, when the territory belonged to Waterboer, a native chief. The disturbances caused by boundary disputes with the Orange Free State and Transvaal Republic resulted in Waterboer's consent to the annexation of Griqualand to Cape Colony in 1871, the chieftain's interests being assured. It was incorporated as four of the seventy-seven divisions of Cape Colony in 1880. The principal towns are Kimberley (capital), De Beers, Griqua Town, Douglas, Belmont, and Barkly.

GRIQUAS, grē'kwäs. Half-caste Dutch-Hottentots of Griqualand East and West, South Africa. Formerly they lived farther south in Cape Colony, but about the middle of the last century they migrated beyond the Orange River under their chiefs Waterboer and Adam Kok. Subsequently the latter, with some followers, moved east to the district now known as Griqualand East. The country of the Western Griquas is a desolate upland 4000 feet in altitude, but containing the richest diamond-fields in the world. The Griquas are an interesting example of a racial mixture transplanted to an isolated habitat, and thus taking the first step in the formation of a distinct race of mankind. This development, however, has been arrested through the settlement of their country by the whites.

GRISAR, grē'zär', ALBERT (1808-69). A Belgian dramatic composer, born in Antwerp. Originally intended for a mercantile career, he soon left his employer and went to Paris, where he studied for a time under Reicha. In 1833 his first opera, *Le mariage impossible*, was produced successfully in Brussels, and gained the composer a Government subsidy, which enabled him to continue his studies in Paris. In 1840 he went to Naples to study under Mercadante, but meanwhile he had produced a number of operas in the leading Paris theatres. Upon his return to Paris, in 1848, Grisar composed a second set of operas, which are marked by a considerable advance on his earlier works. Among his more important operas are: *Sarah* (1836); *L'opéra à la cour* (1840), jointly with Boieldieu; *Le carillonneur de Bruges* (1852); *Les amours du diable* (1853); *Bégaiements d'amour* (1864). He died at Asnières, near Paris. In 1870 his statue was placed in the vestibule of the Antwerp Theatre.

GRIS'COM, JOHN (1774-1852). An American educator. He was born in Salem County, N. J.; was educated at the Friends' Academy, Philadelphia; and for thirteen years was principal of a Friends' school. Then for twenty-five years he taught in New York City, where he projected and for six years supervised the New York High School. He was also one of the founders and the secretary of the Society for the Prevention of Pauperism. He helped to establish the medical department of Rutgers College, where for fourteen years he was professor of chemistry and natural philosophy. He made a tour in Europe to inspect institutions of charity, reform, and education, including manufactories, and published his observations in *A Year in Europe* (1823). He also wrote a book entitled *Monitorial Instruction* (1825). Consult a *Memoir* of Dr. Griscom by his son (New York, 1859).

GRISEBACH, grē'ze-bäg, AUGUST HEINRICH RUDOLF (1814-79). A German traveler and botanist, born at Hanover, and educated at Göttingen and Berlin. He was appointed professor at Göttingen in 1841, and in 1875 was made director of the botanical garden there. Several of his works are devoted to discussions of the flora of the West Indies and of the American tropics. They include: *Spicilegium Floræ Rumelicæ* (2 vols., 1843-45); *Die Vegetationslinien des nordwestlichen Deutschlands* (1847); *Systematische Untersuchungen über die Vegetation der Karaiben* (1857); *Flora of the British West Indian Islands* (1859-64); *Die Vegetation der Erde nach ihrer klimatischen Anordnung* (2d ed. 1884).

GRISEBACH, EDUARD (1845—). A German diplomat and author, son of the preceding. He was born and educated at Göttingen, and was vice-consul of the German Government at Smyrna, and consul at Bucharest, Saint Petersburg, Milan, and Port-au-Prince, Haiti. He first attracted attention by his poems *Der neue Tannhäuser* (17th ed. 1892) and *Tannhäuser in Rom* (7th ed. 1890), which were published anonymously. In his writings he manifests originality and some eccentricity in the selection of his subjects and their treatment. His works include: *Die deutsche Litteratur seit 1770* (4th ed. 1886); *Die treulose Witwe*, in which the author traces the development and treatment of a Chinese fable (5th ed. 1886); and *Kin Ku-Ki-Kuan: Neue und alte Novellen der chinesischen Tausendundeine Nacht* (1880); and *Chinesische Novellen* (1884). His editions of Schopenhauer's works, including many posthumous manuscripts of the great philosopher, are also important.

GRISELDA, grī-zĕl'dä, or **GRISELDIS,** grī-zĕl'dĭs. The heroine of a celebrated mediæval tale, which probably had its rise in Italy. A poor girl, a charcoal-burner, is raised to be the wife of the Marquis of Saluzzo, who puts her humility and obedience to the severest tests. She, however, passes through them all triumphantly, and a reconciliation takes place. In this legend the endurance and self-renunciation of the loving woman are represented as carried to the highest pitch. We find the tradition first worked up into a tale, said to be founded on fact, in

Boccaccio's *Decameron* (the Tenth Novel of the Tenth Day). Petrarch, who owed the story to Boccaccio, translated it into Latin in 1373, under the title *De Obedientia et Fide Uxoria;* and in the fourteenth century the story was well known throughout Europe. In the year 1393 it was in Paris elaborated into a 'mystery' play, *Le mystère de Griseldis, Marquise de Saluces,* and to about the same time belong several French prose versions, such as *Le mesnagier de Paris* and others. In England the story was told by Chaucer in his *Clerke's Tale,* where the great English poet adopts the version given by Petrarch; there is a reference to *Patient Griselda* by Lydgate in his *Temple of Glass;* there are indications of ballads and stories about *Pacyent Gressell* during the sixteenth century, and some ballads of a later date, and still preserved, also deal with the subject; and finally, two plays, one (now lost) of the early sixteenth and one of the early seventeenth century (printed by the Shakespeare Society), treat the same matter. A play on the same subject, by Hans Sachs, appeared in Germany in 1546. Versions of the story are also found in the literatures of Holland, Bohemia, Sweden, Iceland, etc. The old German book entitled *Markgraf Walther* has lately been reproduced with more or less fidelity in Schwab's *Buch der schönsten Geschichten und Sagen,* Marbach's *Volksbücher,* and Simrock's *Deutsche Volksbücher.* Consult: Westenholz, *Die Griseldissage in der Litteraturgeschichte* (Heidelberg, 1888); *Originals and Analogues of Chaucer,* part ii. (London, 1875), Chaucer Society; Child, *English and Scottish Ballads,* vol. iv. (Boston, 1882); Warton, *History of English Poetry,* edited by Hazlitt, vol. iv. (London, 1870).

GRISETTE, grē'zĕt' (Fr.). A sort of woolen cloth, so called from its gray color, frequently worn by the French women of the lower class. Hence the name is applied to young women employed as shop girls, sewing girls, chambermaids, etc. It is also used in a more special sense by foreigners to designate the young women of this class in Paris who are of doubtful character, and of the type made famous by Henry Murger in his *Vie de Bohême.*

GRISI, grē'zē, GIULIA (1811-69). A famous Italian dramatic soprano. She was born in Milan, and was a pupil of Giacomelli, Madame Pasta, and Marliani. She was one of the greatest singers of the nineteenth century, and was at the height of her fame during the period of 1834-49, when she was the unquestioned prima donna of the Parisian and London operatic stage. In 1836 she married Count Melcy, from whom she was afterwards divorced, later marrying her principal operatic support, Mario, the famous tenor, with whom she made a tour of the United States in 1854. She died in Berlin.

GRIS'KINIS'SA. In Rhodes's burlesque *Bombastes Furioso,* the consort of Artaxaminous, King of Utopia, whom he wishes to put aside for the fair Distaffina.

GRIS-NEZ, grē'nā'. CAPE. A headland of France, in the Department of Pas-de-Calais, opposite and 21 miles distant from Dover, the point of land nearest to England (Map: France, H 1). Cape Gris-nez is about equidistant from Calais on the northeast and Boulogne on the south. It has a lighthouse.

GRISON, grī'son (Fr., gray), or HURON. A large, plantigrade, musteline mammal (*Galictis vitata*) of South and Central America, weasel-like in form, and about two feet long without the tail, which is about a foot long. Its coloration is peculiar in that it is light above and dark below—coal-black, except on the top of the head, back, and tail, where the hair is long and gray. The sharp contrast between the gray crown and the black face gives the animal a singular and rather vicious aspect. It is savage in disposition, and when irritated gives a barking squeal, and emits a pungent odor more disgusting than that of a skunk. It lives in hollow trees, clefts in rocks, and holes in the ground, and frequents plantations and the neighborhood of buildings. A larger and less common, but otherwise similar, species is Allemand's grison (*Galictis Allemandi*). Compare TAYRA.

GRISONS, grē'zōn' (Ger. *Graubünden*). The largest, the most eastern, and the most thinly inhabited of the cantons of Switzerland. It is bounded on the north by the cantons of Glarus and Saint Gall, and by Liechtenstein and Vorarlberg; on the east by Tyrol; on the south by Lombardy; and on the west by the cantons of Ticino and Uri (Map: Switzerland, D 2). Its area is 2770 square miles. The surface of the canton is broken by mountains. The Glarner Alps border on the northwest, and the Bernina on the southeast. The Leopontine Alps enter from the west, the Adula group being in the southwestern part of the canton. In the east is the Rhætian range. There are two large valley districts, of which the first and most important lies along the course of the Hither Rhine, and occupies the northwestern portion of the canton; and the second, that of the Inn, forming the Engadine (q.v.), extends through the southeastern and eastern parts. In the southern or southeastern sections are the valleys belonging to the basins of the Ticino, Adda, and the Adige. The lakes are small. The climate is quite varied. In some districts winter reigns for nearly eight months, while the climate in the southern valleys is like that of the northern border of Italy. The upper valleys, particularly the Engadine and Davos, attract invalids from all the civilized world. Among the many famous 'air-cure' resorts are Davos-Platz and Saint Moritz.

About 55 per cent. of the canton is productive. In the colder districts crops of barley and rye are raised with difficulty. In the southern valleys, however, wheat, corn, the vine, fig, and almond are successfully cultivated. Pastures and forests occupy a large portion of the country. Cattle, skins, timber, and cheese are the principal exports. The rivers abound in salmon and trout, and in the mountains are deer, chamois, bears, and other game. The mineral deposits are nearly exhausted. Rare varieties of marble are quarried, and there are numerous mineral springs. The manufacturing industries are unimportant, and are confined chiefly to the production of cotton goods, leather, and beer. The railway mileage is small, but there are many good roads in every part of the canton. The legislative power is in the hands of the Grosser Rat (Great Council), consisting of members elected at the rate of one for every 1300 inhabitants. The executive power is vested in a council of five elected members. The obligatory and facultative referendum and the initiative are

in force. The Constitution of the canton dates from 1892. There are fourteen administrative districts. The cantonal finances are on a safe and self-adjusting basis, owing to the rather unique fact that the land tax must each year cover any deficit. Population, in 1888, 94,810; in 1900, 104,510, about equally divided between Protestants and Catholics. German is spoken by about half of the population, and about one-third speak Rhæto-Romanic (Rumansh). The emigration is very light. The higher educational institutions include a 'real' school, a gymnasium, a technical and a commercial school, and a priests' seminary. The capital and chief town is Chur (q.v.).

The canton constituted a part of the ancient Rhætia, which was subdued by the Romans in the reign of Augustus. From the Goths, who overran the country about A.D. 490, it passed into the power of the Frankish kings, and by the Treaty of Verdun (843) was included in the portion of Louis the German, forming a part of the Duchy of Alemannia. During the early Middle Ages the peasantry suffered cruelly from the oppression of their feudal nobles, whose perpetual strife often brought devastation upon the country. With the rise of free towns some attempt was made to check the feudal anarchy by associations of burghers, acting in alliance with the great ecclesiastical lords, chief of whom was the Bishop of Chur, or Coire. In 1367 the league known as the Gotteshausbund was established, and in 1395 the Upper or Gray League (German *Grauer Bund*) was organized. A third league, the Zehngerichtenbund (League of the Ten Jurisdictions), was formed in 1436, out of the possessions of the House of Toggenburg. About the middle of the fifteenth century these leagues formed a loose federal union, and between 1497 and 1567 all three had entered into alliance with the Swiss Confederation. In the early part of the sixteenth century the inhabitants of Grisons succeeded in conquering Bormio, Chiavenna, and the Valtellina, in Northern Italy. The Reformation early made its way into Grisons. The bulk of the inhabitants included in the Gray League, however, adhered to the Catholic Church, and religious strifes long distracted the region. The claims of Austria to certain territories were bought off in 1652. From that time to the end nearly of the eighteenth century the history of the country is one of petty strife between factions. In 1797 its Italian possessions were annexed to the Cisalpine Republic, and during the next two years it was the battlefield of the Russians, the Austrians, and the French. In 1803 it was constituted by Napoleon a member of the Swiss Confederation. Its history during the nineteenth century was principally one of constitutional reform, marked by progress in the direction of a closely centralized form of government.

GRIST-MILL. See FLOUR.

GRISWOLD, griz'wold, ALEXANDER VIETS (1766-1843). An American clergyman, bishop of the Protestant Episcopal Church, born in Simsbury, Conn. He at first studied law; but in 1795 he was ordained to the ministry, and began preaching in three different towns, besides teaching school. In 1804 he became rector of Saint Michael's Church, Bristol, R. I., and in 1811 was consecrated first Bishop of the 'Eastern Diocese,' in which were included the States of Maine, Vermont, New Hampshire, Massachusetts, and Rhode Island. In 1830 he left Saint Michael's to accept the rectorship of Saint Peter's in Salem. His last public act was the consecration of his successor, Dr. Manton Eastburn. He published many sermons, and *The Reformation and the Apostolic Office* (1843). Consult Stone, *Life of Bishop Griswold* (Philadelphia, 1844).

GRISWOLD, JOHN AUGUSTUS (1822-72). An American manufacturer and politician. He was born in Nassau, Rensselaer Co., N. Y., and when seventeen years old went to Troy, where he entered the hardware business. After engaging for a number of years in the wholesale and retail drug trade, he became a partner in the Rensselaer Iron Company, and was very successful. In March, 1875, he consolidated his works with the Albany Iron Works, to form the Albany and Rensselaer Iron and Steel Company. He was associated with C. H. Delamater in building the *Monitor*, which defeated the *Merrimac* in Hampton Roads, and in conjunction with two other citizens of Troy introduced the manufacture of Bessemer steel into the United States. Griswold was elected Mayor of Troy in 1855. Upon the outbreak of the Civil War he aided in raising a number of infantry and cavalry regiments, one of which, the Griswold Light Cavalry, took his name. He was elected to Congress by the Democrats in 1863, but soon after changed his political creed, and was twice reëlected by the Republicans. In the House he supported the war measures of the Government. He was nominated for Governor of New York in 1868, but was defeated by the Democratic candidate, John T. Hoffman.

GRISWOLD, MATTHEW (1714-99). An American jurist. He was born at Lyme, New London Co., Conn., the son of John Griswold, one of the wealthiest men in New England. He studied law, and was admitted to the bar in 1743. In 1751 he was elected to the General Assembly, and in 1759 was chosen a member of the Governor's Council, in which he appeared as a champion of the rights of the colonies, and opposed the Stamp Act. He was appointed to the bench of the Supreme Court of Connecticut in 1766, became Chief Justice in 1769, and served until his election as Governor in 1784. He was Deputy Governor from 1771 to 1784, and was chairman of the Connecticut Committee of Safety in 1775. As Governor from 1784 to 1786 he did what he could to foster the national spirit in Connecticut, and was president of the convention that ratified the Constitution of the United States in January, 1788.

GRISWOLD, ROGER (1762-1812). An American politician, born at Lyme, Conn., the son of Matthew Griswold. He graduated at Yale College in 1780, studied law, and was admitted to the bar in 1783. He was a member of Congress from 1795 to 1805. In 1801 President Adams appointed him Secretary of War; but he declined the office, and afterwards was appointed judge of the Supreme Court of Connecticut, a position which he held until elected Lieutenant-Governor in 1809. At the expiration of his term in 1811 he was elected Governor, and served until his death, in 1812.

GRISWOLD, RUFUS WILMOT (1815-57). An American critic and compiler, born at Benson,

Vt. By serving an apprenticeship to a newspaper publisher, he acquired practical knowledge of printing and editing. Wearying of this work, he studied theology and preached acceptably as a Baptist minister, but finally turned to editing and compiling. He was associated from 1841 till his death with various magazines and journals, beginning with *Graham's* in Philadelphia. Besides his editorial work he compiled the once very popular and still useful *Poets and Poetry of America* (1842); *Poets and Poetry of England in the Nineteenth Century* (1845); *Prose Writers of America* (1846); *Female Poets of America* (1848); *Sacred Poets of England and America* (1849). Numerous other works, written singly or in collaboration, are now practically forgotten. He edited the first American edition of *Milton's Prose*, and as literary executor of Poe superintended the first edition of that poet's works (1850), to which he contributed a *Memoir* that was a subject of much controversy. Griswold was industrious and well-meaning, but not discriminating in his criticism. Still he did important work in encouraging young writers and stimulating interest in American literature; and his correspondence, published by his son, W. M. Griswold (Cambridge, Mass., 1898), is of great value.

GRISWOLDVILLE, grĭz'wold-vĭl. A village in Jones County, Ga., about 10 miles east by north of Macon, on the Central of Georgia Railroad (Map: Georgia, C 3). On November 22, 1864, it was the scene of a stubborn engagement between a brigade of Sherman's army under General Walcott and a division of the Georgia Confederate militia under General Phillips. The latter attacked and retired after several hours of fighting. The Federals lost 84 in killed, wounded, and missing, General Walcott being among the wounded. The Confederates lost 600. Population, about 100.

GRIT. See SANDSTONE.

GRIVEGNÉE, grē've-nyā'. A town of Belgium, in the Province of Liège, situated about two miles southeast of Liège, on the right bank of the Ourthe (Map: Belgium, D 4). It has manufactures of ships, machinery, engines, and other metal products. Population, in 1890, 9569; in 1900, 10,550.

GRIVET (from Fr. *gris*, gray + *vert*, green). A small monkey (*Cercopithecus griseoviridis*), one of the guenons inhabiting Northeastern Africa. It is olive-green in color on the back, while the face and under parts are white, and the root of the tail is gray. A broad white band on the forehead distinguishes it from the vervet. These monkeys go about in small bands, are not numerous, and are docile, good-tempered, and intelligent in captivity.

GRIZZLE, MRS. The shrewish wife of Commodore Trunnion and sister of the title character, in Smollett's *Peregrine Pickle*.

GRIZZLY BEAR. See BEAR.

GROAT (Dutch *groot*, great). A name given in the Middle Ages to all thick coins, as distinguished from the 'bracteates' (Lat. *bractea*, a thin plate or leaf), or thin coins of silver or gold leaf stamped so as to be hollow on one side and raised on the other. Groats differed greatly in value at different times and in different countries. The silver groat once current in England (introduced by Henry III.) was equal to fourpence. The coin, though not the name, was revived in the modern fourpenny piece. Groschen were until lately current in Germany. The silver groschen, or *neu-groschen*, of Prussia and the Zollverein, was $\frac{1}{30}$ of a thaler, and was worth two cents, American; the *guter groschen* of Hanover was $\frac{1}{24}$ of a thaler, and was worth three cents, American.

GROAT'S-WORTH OF WIT, A, BOUGHT WITH A MILLION OF REPENTANCE. A tract by Robert Greene (q.v.) discovered after his death, together with a pathetic letter to his wife. It was licensed in 1592, but apparently not published until 1596. The story is in part autobiographical, and contains an allusion to Shakespeare as "an upstart crow."

GRÖBEN, grē'ben, OTTO FRIEDRICH VON DER (1657-1728). A German traveler, born at Pretten, Prussia. At the age of sixteen he went to the Orient, where he traveled for many years. In 1682 he was sent by Frederick William of Brandenburg to the western coast of Africa, where, in the following year, he founded Fort Grossfriedrichsburg, named in honor of the Great Elector, on the coast of Guinea. An account of his tours is published in his work entitled *Orientalische Reisebeschreibung des brandenburgischen adelichen Pilgers, nebst der brandenburgischen Schiffahrt nach Guinea und der Verrichtung zu Morea* (1694), the last-mentioned reference bearing upon the author's subsequent experiences in the wars of Poland and Venice against the Turks.

GRÖBER, grē'ber, GUSTAV (1844—). A German scholar in Romance literature and linguistics. He was born in Leipzig, and was educated there. He was docent at Zurich (1871-74), then became professer at Breslau, and in 1880 went to the University of Strassburg. In 1877 he became editor of the *Zeitschrift für romanische Philologie*, and in 1880 began the publication, as editor-in-chief, of the *Grundriss der romanischen Philologie*, to which he contributed articles on Latin literature during the Middle Ages, and on the history of Romance philology. Gröber's other works include: *Die handschriftlichen Gestaltungen der Chanson de Geste von Fierabras* (1869); *Die altfranzösischen Romanzen und Pastourellen* (1872); *Carmina Clericorum* (7th ed. 1890); *Zur Volkskunde aus Concilbeschlussen und Kapitularien* (1894); *Abriss der lateinischen Litteratur des Mittelalters* (1893); and *Abriss der französischen Litteratur des Mittelalters* (1897).

GROCYN, grō'sĭn, WILLIAM (?1446-1519). An English Hellenist, supposed to have been the first publicly to teach Greek at Oxford. He was born at Colerne, Wiltshire, and after studying at Oxford, visited Italy to pursue under Politian and Chalcondyle the study of Greek, at that time little cultivated in England. He received his appointment at Oxford about 1492. Grocyn was the friend of Linacre, More, Colet, and of Erasmus, who speaks of him as his *patronus et præceptor*. With the exception of an epigram on a lady who threw a snowball at him, and his Latin letter to Aldus Manutius, which is prefixed to Linacre's *Procli Sphæra* (Venice, 1499), no writings by Grocyn are known.

GRODEK, grō'dĕk. A town of the Austrian Crownland of Galicia, situated on a lake about 20 miles southwest of Lemberg (Map: Aus-

tria, H 2). Its chief industry is the cultivation of flax. Much grain is handled. Population, in 1890, 10,742; in 1900, 11,845.

GROD'NO. A government in the western part of European Russia, formerly a portion of Lithuania, bounded on the north by the Government of Vilna, on the east by that of Minsk, on the south by Volhynia, and on the west by Poland (Map: Russia, B 4). Area, nearly 14,950 square miles. The land is in general flat, and belongs in the southwest to the basin of the Vistula, in the north to that of the Niemen, and in the southeast to that of the Dnieper. The extensive morasses in the south have been partly converted into pasture ground by draining; in the north are extensive pine forests. The soil is light and sandy, and in general fruitful. The climate is mild for the latitude. Rye is the principal agricultural product. Barley, oats, beans, wheat, and potatoes are also extensively raised. Cattle and sheep are exported. The chief branches of industry comprise manufactures of cloth, leather, tobacco, flour, and bricks. Population, in 1887, 1,354,400; in 1897, 1,617,859. Capital, Grodno (q.v.).

In the eleventh century the Great Russians began to settle in this region, then a marshy plain covered with impenetrable forests, and inhabited by the semi-savage Yatviags. In the thirteenth century it became part of Lithuania; in the sixteenth century it was incorporated with Poland, and in the partition of that kingdom was annexed by Russia.

GRODNO. A city of Russia and the capital of the government of the same name, situated on the Niemen, 160 miles northeast of Warsaw, and 540 miles southwest of Saint Petersburg (Map: Russia, B 4). It is divided by the Niemen into two parts; the northern part or the city proper contains the extensive and handsome palace erected by Augustus II., and is connected with the southern part by an iron bridge. The city is poorly built; it contains a number of ancient buildings, the Bernardine Monastery, erected in 1494, being the oldest of them. The chief articles of trade are grain and timber, the latter being rafted down the Niemen. The principal industries include the manufacture of pottery, tobacco, paper boxes, soap, tallow candles, and machinery. Population, in 1886, 39,900; in 1897, 46,871, including 30,000 Jews.

During the last century of Polish rule Grodno was frequently the seat of the Diet. It was here that the second partition of Poland was agreed upon in 1793. The town passed to Russia in 1795. It was occupied by the French in 1812.

GROEN VAN PRINSTERER, grōōn vȧn prĭn'stēr-ẽr, GUILLAUME (1801-76). A Dutch statesman and historian, born at Voorburg. He studied law and letters at Leyden, and took a degree in each course, with dissertations *De Juris Justiniani Præstantia* and *De Prosopographia Platonica*. His earliest historical work, *Verspreide geschriften*, appeared in 1826. Three years afterwards he was appointed private secretary to William I., but resigned in 1833 to devote himself more closely to his duties as editor of *Nederlandsche Gedachten* and to historical study. He published at this period *Archives, ou correspondance inédite de la Maison d'Orange-Nassau* (1835-47; continued 1857-61), and a *Handboek der geschiedenis van het Vaderland* (1841-46). In 1840 his interest in current politics was shown by his *Bijdrage tot de herziening der grondwet in nederlandschen zin*. He was elected to the House of Deputies in the same year, and was again chosen deputy in 1849, keeping his seat almost continuously until 1865. He died at The Hague. His works, besides those mentioned, include: *Ongeloof en revolutie* (2d ed. 1868), expressing his ideas on domestic politics, which may also be found in *De Nederlander*, which he published from 1850 to 1855; *La Prusse et les Pays Bas* (1867), on European politics; and the historical memoir *Maurice et Barnevelt* (1875). Consult: Stuart, *In Memoriam: notice biographique* (Utrecht, 1876); and Vos, *Groen van Prinsterer en zijn tijd* (Dordrecht, 1886-91).

GROESBECK, grōōs'bĕk, WILLIAM SLOCOMB (1815-97). An American politician, born in New York City. He graduated at Miami University, Oxford, Ohio, in 1835, studied law, and opened an office in Cincinnati. He was a member of the State Constitutional Convention in 1851, and the next year was appointed a member of the commission to codify the laws of Ohio. He represented his district as a Democrat in Congress from 1857 to 1859; was a member of the Peace Congress in 1861, a delegate to the National Union Convention in Philadelphia in 1866, and one of the counsel for President Johnson during the impeachment trial in 1868, after the retirement of Jeremiah S. Black from the case. In 1872 he was nominated for President by the Liberal Republicans who were displeased with Horace Greeley, but his ticket was forgotten during the excitement of the campaign, at the end of which he received one electoral vote for Vice-President. In 1878 he was appointed United States delegate to the International Monetary Congress at Paris.

GROGG, COLONEL. A sobriquet given to Sir Walter Scott by the other members of a small Highland society, known as 'The Club,' in which he was a prime mover.

GROINED VAULTING (from *groin*, earlier *grine*, variant of *grain*, from Icel. *grein*, branch of a tree). In architecture, that vaulting in which two barrel vaults intersect each other at right angles, on a square plan, and with semicircular curve. The arris or salient edge formed at the lines of intersection is called the groin. Such vaults were usually small, and employed in considerable numbers, forming a connected series of square vaulting compartments. It was a form first extensively used in Roman architecture, and continued throughout the early Middle Ages, where it is found especially in the side aisles of churches, though also sometimes in the naves. It was superseded during the twelfth century by *ribbed vaulting* (q.v.), a much stronger and more elastic form of cross-vault. Roman examples are in the passageways and galleries of amphitheatres on a small scale, and in the halls of thermæ on a large scale.

GROLIER (grō'lyȧ') **CLUB.** A celebrated society of bibliophiles, founded in New York City in January, 1884. The club is named after Jean Grolier de Servières, Viscount d'Aguisy, Treasurer-General of France, whose library was famous. The objects of the club are literary study and the promotion of the arts of typesetting, printing, and binding. The founders of

the club, who have also been largely instrumental in its success, were William L. Andrews, A. W. Drake, Albert Gallup, Robert Hoe, Jr., Brayton Ives, Samuel W. Marvin, E. S. Mead, and Arthur B. Furnure. A club house is maintained in New York, and contains an excellent bibliographical library, a lecture and reading room, and many valuable pictures and prints. By exhibitions, lectures and the issue of specially prepared books, perfection in the art of bookmaking is encouraged. The club has issued over a score of publications since its formation, including the edition of the *Philobiblion* of Richard du Bury, and *Catalogues of Early and Original Editions from Langland to Wither; Bookbinding as a Fine Art*, by Robert Hoe; *Modern Book Binding*, by William Matthews; and *Historic Printing Types*, by T. L. De Vinne. An original, otherwise unpublished work is *Washington Irving*, by George William Curtis.

GROLIER DE SERVIÈRES, grō'lyâ' de sâr'vyâr', JEAN, Viscount d'Aguisy (1479-1565). A French bibliophile, born in Lyons in 1479. He was the royal French representative in Italy for some time, mostly at Rome and Milan, where he cultivated his taste as a book-lover. He was made treasurer of Francis I. in 1537, and was a noted collector of books, valuable or curious for subject, material, workmanship, or binding. He was a master of the art of elegant bookbinding, and his volumes are highly prized by bibliophiles. They were usually in brown leather and in Renaissance patterns, with stripes and plant arabesques. His library, which numbered finally about 3000 volumes, was kept in his family until toward the last of the eighteenth century, when it was sold and scattered. At present only some 400 volumes are said to be known, the largest number being in the possession of the National Library in Paris. He died in Paris in 1565. Consult: Le Roux de Lincy, *Recherches sur Jean Grolier* (Paris, 1866); and Clément de Ris, *Les amateurs d'autrefois* (ib., 1876).

GROLMAN, grōl'mân, KARL WILHELM GEORG VON (1777-1843). A German soldier, born in Berlin. He entered the army at the age of fourteen. After serving on the Military Commission of 1807 which was appointed to reorganize the Prussian Army, he left the Prussian service, which he did not reënter until 1813. He fought in the subsequent campaigns against Napoleon, and at the battle of Waterloo was quartermaster-general on the staff of Blücher. He did much to promote the extension of German influence in the Province of Posen. His works include: *Geschichte des Feldzugs von 1814* (1842), and *Geschichte des Feldzugs von 1815 in den Niederlanden und Frankreich* (1837).

GROMMET (OF. *gromet, grommet, gourmet*, apprentice, diminutive of *gromme, gourme*, from Icel. *grōm*, Eng. *groom*, man). A grommet is formed from a single strand of rope, which is laid up again to form a circle of three-stranded rope. See KNOTTING AND SPLICING.

GROMWELL (earlier *grommel, grummel*, from OF. *gremil*, Fr. *grémil*, grummel), *Lithospermum*. A genus of plants of the natural order Boraginaceæ. Its members have a funnel-shaped corolla, which conceals the shorter stamens, and achenia of stony hardness. Extraordinary virtues were formerly ascribed to them, which, however, were wholly imaginary, particularly to the common gromwell (*Lithospermum officinale*), which was used to cure stone in the bladder. The common gromwell is a native of dry, gravelly places in Europe, Asia, and North America. It has an erect, much-branched stem, broadly lanceolate leaves, and small flowers. There are about forty species of Lithospermum, which occur throughout the temperate zones of the world. In the United States there are eight or ten species. Some have perennial roots that yield a red dye similar to alkanet.

GRONGAR (grōn'gēr) **HILL.** A descriptive poem by John Dyer (1727). An earlier version appeared in a volume of miscellaneous poems published in the preceding year. The title was suggested by the name of a hill in South Wales, a region through which the author had shortly before wandered as an itinerant artist.

GRONINGEN, grō'nin-gen. The northeastern province of Holland, bounded on the north by the North Sea, on the east by Germany and the Dollart, on the south by Drenthe, and on the west by Friesland. Area, 904 square miles. Population, in 1900, 299,033. There is considerable shipping and industrial activity, but it is chiefly an agricultural province. The northern and northeastern districts produce wheat and oil seeds; the southern fen lands yield peat; potatoes, rye, and buckwheat are cultivated, and cattle are raised. The province was the ancient Cruoninga. Capital, Groningen.

GRONINGEN. The most important town in the north of the Netherlands, and capital of the province of the same name, situated at the confluence of the Hunse and the Aa, and at the converging of a number of railway lines and canals, 22 miles west of the Dollart Inlet (Map: Netherlands, E 1). It is a well-built town, crossed by numerous canals and surrounded with promenades and walks laid out on the site of the old fortifications. The market-place (Groote Markt) is one of the largest in Holland. The most prominent buildings are the Gothic Church of Saint Martin, surmounted with a tower 343 feet high; the town hall, built in 1810, and containing a collection of coins; the Government buildings, the theatre, and the prison. The University of Groningen, founded in 1614, is composed of five faculties, and has an attendance of over 400. Attached to it are a library of over 90,000 volumes, an observatory, a botanical garden, a museum of natural history, a hospital, and a number of laboratories. Among the other educational institutions of the town may be mentioned the gymnasium, the academy of architecture and navigation, and the deaf and dumb asylum. The town manufactures sugar, textiles, furniture, mirrors, gold and silver ware, cigars and tobacco, trimmed lumber, ships, machinery, etc. The harbor is accessible to sea-going vessels, and has considerable shipping. The trade of Groningen is chiefly in grain, rape-seed, and animal products. Population, in 1899, 66,537, including about 7000 Roman Catholics and 3000 Jews.

Groningen was granted by the Emperor Henry III. in 1040, when it was known as Villa Cruoninga, to the Bishop of Utrecht. It was fortified in the thirteenth century, and joined the Hanseatic League as early as 1282. In 1594 the city was taken by Maurice of Nassau, and annexed to

the United Netherlands. In 1672 the town withstood the attack of the Bishop of Münster.

GRONLUND, grōn'lund, LAWRENCE (1847-99). An American Socialist, born in Denmark. He received the degree of Master of Arts in the University of Copenhagen in 1865, and two years afterwards came to the United States. He was converted to socialism by Pascal's *Pensées*, and gave up the practice of law to write and lecture on socialism. His principal works are: *The Coming Revolution* (1880); the *Coöperative Commonwealth* (1884); *Ça Ira, or Danton in the French Revolution* (1888); *Our Destiny* (1890); *Insufficiency of Henry George's Theory* (1887); and *The New Economy* (1898). He published *Ça Ira* to prove that Danton had been misjudged. He considered the United States more advanced, and therefore better fitted for a socialistic régime, than any other country; that the only obstacle is the negro problem, but that social equality between the black and white races can and will be established. A vast national organization, composed of energetic young men from every locality, could bring about a peaceful revolution in a few years. He thought that the reforms proposed by Henry George were not comprehensive, and that the coöperative association of Jean Godin was inadequate because it paid too little attention to the social life of the people. He wrote *Our Destiny* to prove that, instead of being necessarily associated with atheism, socialism would reveal to all the immortality of the soul.

GRONO'VIUS. The Latinized name of two distinguished Dutch classical scholars of the seventeenth century. (1) JOHANN FRIEDRICH GRONOV (1611-71), born at Hamburg, September 8, 1611. He became professor of history first at Deventer (1642), and then professor of Greek at Leyden (1658), and acquired an international reputation for profound learning. He was a prolific writer, publishing critical editions of Plautus, Terence, Cicero, Sallust, Livy, Seneca, Statius, Tacitus, Pliny, and Aulus Gellius; and edited the works of his friend Hugo Grotius (q.v.). All his work was in Latin, as his *De Iure Belli et Pacis Libri Tres* (Amsterdam, 1642). He died at Leyden, December 28, 1671. (2) JACOBUS GRONOV (1645-1716), son of the preceding, born at Deventer, became a scholar of great renown. He traveled in England, France, and Italy, meeting the greatest classical scholars of those countries. At the invitation of the Grand Duke of Tuscany, he accepted the chair of law in the University of Pisa, but returned to Leyden in 1679 to fill the chair of Greek literature and history in that university. He brought out many editions of his father's texts, and in addition published annotated editions of Herodotus, *Cebetis Tabula*, Polybius, Cicero, Tacitus, Gellius, Minutius Felix, and Ammianus Marcellinus. But his greatest work was the *Thesaurus Antiquitatum Græcarum*, in thirteen folio volumes, published at Leyden, 1698-1702. He engaged in many learned controversies with other scholars, in which his irascible temperament led him to personal abuse and scurrility. Notable were his sarcastic letters to Fabretti (q.v.), *Responsio ad Cavillationes Raphaeli Fabretti* (Leyden, 1685), and to Voss (q.v.), *Epistula de Argutiolis Isaci Vosii* (Leyden, 1687). Gronovius died at Leyden, October 21, 1716.

GROOT, grōt, HUIG DE. See GROTIUS.

GROOTE, grō'te, **GROOT, GROETE,** GERHARD, called GERARDUS MAGNUS, 'Gerard the Great' (1340-84). The founder of the Brothers of the Common Life. He was born at Deventer, Holland, and educated at Paris, where he gained much learning. He became a teacher there and in various other places. He was not in holy orders, but held a number of benefices, living luxuriously until converted by a friend in 1374. He then gave up his benefices, and, refusing any higher position than deacon, became a traveling and highly successful preacher (1379). He opposed the scholastics, advocated the reading of the Scriptures, and translated the Psalms into the common language. He gathered a company for the transcribing of books of the Bible, and enforced upon them the practice of community of goods. From this association arose the Brothers of the Common Life (q.v.). The order grew rapidly, and in spite of the opposition of the monastic orders, it was sanctioned by the Pope in 1418. Groote's own bishop was at first favorable to him, but the opposition of the clergy and of the civil authorities led to his being silenced in 1383. He died of the plague at Deventer, August 20, 1384. His life was originally written by Thomas à Kempis, who belonged to the Brothers of the Common Life. He left numerous writings. For his life, consult Bonet-Maury (Paris, 1878).

GROS, grō, ANTOINE JEAN, Baron (1771-1835). A French historical painter. He was born in Paris, March 16, 1771. He shared with Ingres the reputation of being the greatest of David's pupils. Trained in correct drawing by his father, a miniature painter, at the age of fourteen he came under the instruction of David. In 1793 he visited Italy, where he was associated through Josephine with Napoleon Bonaparte, who made him Inspector of Reviews, thus giving him the opportunity to acquire knowledge for the battle scenes he later executed, and appointed him one of the commissioners to select the works of art which Napoleon took from Italy. In 1796 Gros painted "Bonaparte at the Bridge of Arcole." His "Plague at Jaffa," exhibited in 1805 and purchased by the Government, made him famous. Gros was always disposed to struggle against the romantic tendency which is more or less observable in his art, and endeavored to maintain the principles of the Classic School as practiced by David. In 1816 he was made member of the Institute and professor in the Ecole des Beaux-Arts, and in 1828 officer of the Legion of Honor. For his painting in the cupola of the Pantheon, which represents the four chief dynasties of France offering their deeds as homage to Sainte Geneviève, he received in 1824 the title of Baron. Gros essayed in the last years of his life to return to the purely classic in his works "Hercules and Diomedes" and "Acis and Galatea;" but the result compared so unfavorably with the examples of the Romantic School, then in the ascendency, that the adverse criticism they evoked affected his mind, and he committed suicide in the Seine on June 27, 1835.

Gros's art represents the transition from the classic art of David to that of the Romantic School. He was the first to abandon classic subjects in favor of historical. To the drawing and composition of David's school he added excellence of color, depth of feeling, and vigor of action.

His "Plague at Jaffa" (1805), now in the Louvre, is a masterpiece in this regard. It represents Napoleon ministering to his plague-stricken and dying soldiers in an Oriental courtyard. "Napoleon at Eylau" (1808), also in the Louvre, is equally important. In the same vein is "Napoleon Before the Pyramids" (1810). Besides this picture, the Museum of Versailles contains other great historical pictures, the best of which is the "Flight of Louis XVIII. from the Tuileries" (1816). "Francis I. and Charles V. at Saint Denis" (1808), in the Louvre, called by the painter his "Bouquet," is the best of his works in color. His portraits, of which the Gallery of Versailles contains a large number, are of great strength. Among the best are those of Generals Masséna, Lasalle, and Fournier-Sarlovese (Versailles). His works in the classic style are the weakest of his productions. He left a large number of influential pupils.

Consult the biographies of Gros by Delestre (Paris, 1867), Tripier le Franc (ib., 1880), and Dargenty (ib., 1887). See also Chesneau, *Les chefs d'école* (ib., 1883), and Delacroix, in the *Revue des Deux Mondes* (1848).

GROS, Pierre le. See Legros, Pierre.

GRO'SART, Alexander Balloch (1827-99). An English literary antiquary, born at Stirling, Scotland. Ordained as minister in the United Presbyterian Church in 1856, he settled as pastor of Saint George's Church, Blackburn, Lancashire, in 1868. Owing to ill health, he resigned in 1892, and passed his last years in Dublin. He wrote hymns and religious works, but is known chiefly for his editions of Elizabethan and post-Elizabethan writers, Spenser, Sidney, Nash, Greene, Barnfield, Donne, Giles Fletcher, Vaughan, Herbert, Herrick, and others, published in the Fuller Worthies' Library, the Chertsey Library, the Huth Library, and elsewhere. Grosart performed a valuable service in collecting a mass of literary material, which needs sifting by more exact scholars.

GROSBEAK (from *gross* + *beak*, imitated from Fr. *grosbec*, grosbeak). Any of several birds, especially of the family Fringillidæ, notable because of the great thickness of the bill, which can be used for breaking the stones of cherries, olives, and the like. The hawfinch (q.v.) and greenfinch (q.v.) are common European examples. In America a number of birds, which have no close association with each other, are so called—prominently the cardinal. (See Cardinal-Bird.) The pine grosbeak (*Pinicola enucleator*) breeds in the far North, but in winter is found as far south as Washington, though its appearance is very irregular. As it usually appears, the color is slaty gray, with yellowish or reddish olive feathers on the crown and rump. In full plumage, however, the males are beautiful rosy-red. The length is about nine inches. The rose-breasted grosbeak (*Habia Ludoviciana*) is one of the handsomest birds of Eastern North America. The male is black above and white below, with the breast a beautiful rose-red; the female is grayish-brown and buffy. The length is eight inches. This grosbeak breeds as far north as Maine and Manitoba, but it winters in Central and South America. Its song is brilliant though not elaborate. In the far West it is replaced by the black-headed grosbeak (*Habia melanocephala*), the male of which has the breast orange-brown instead of rose. (See Colored Plate of Eggs of Song-Birds.) In the Southern States the blue grosbeak (*Guiraca cærulea*) is a summer resident. The male is deep blue in color, and about seven inches long. In the interior of North America from Manitoba northward is found the very handsome evening grosbeak (*Coccothraustes vespertinus*), which is black, yellow, olive-brown, and white. The length is about eight inches. This grosbeak is irregularly migratory in winter, and in 1890 large flocks appeared in New England, where they were common for several weeks. It is usually a rare bird in any part of the United States except near Manitoba. It received its name under the impression that it sang only at twilight; but its voice is heard all day as it seeks its food (seeds, buds, and insects) in the forest trees. Three of the species above mentioned are illustrated on the Plate of Buntings, etc.

GROSE, Francis (c.1731-91). An English antiquarian writer, born in Middlesex of a Swiss father and an English mother. He began his career as an architectural draughtsman, but his improvident habits made it necessary for him to combine this with other occupations, and he is known principally by his antiquarian researches. Grose's voluminous writings include general discourses upon the antiquities of England and Wales, Scotland, and Ireland, and special articles, upon armor, for example, while his humor is shown in parodies, dictionaries of slang, and proverbs.

GROSE, William (1812-1900). An American soldier and politician, born in Dayton, Ohio. When he was three years old his family removed to Indiana, which thenceforth was his home. He received a common-school education, studied law, and in 1852 was a Presidential elector on the Pierce ticket and a candidate for Congress. When the Republican Party was organized soon afterwards he joined it, and in 1856 was elected to the Legislature. At the outbreak of the Civil War he was a judge of the Court of Common Pleas, but resigned in order to recruit the Thirty-sixth Indiana regiment of infantry, of which he was commissioned colonel on August 30, 1861, and which joined the Army of the Cumberland. During the succeeding campaigns Grose commanded a brigade in the battles of Murfreesboro, Chickamauga, and Chattanooga. He was commissioned a brigadier-general on July 30, 1864, in the midst of the operations before Atlanta; at the battle of Nashville (December 15 and 16, 1864) he commanded the Third Brigade in General Thomas's army; and in 1865 he was brevetted major-general of volunteers. From 1866 to 1874 he was collector of internal revenue for the Fifth District in Indiana; in 1877 he was sent to the Legislature for the second time, and from 1879 to 1883 was a State Senator. He again ran for Congress in 1878, this time on the Republican ticket, but was again defeated. From 1884 to 1886 he was one of a commission appointed to build three State hospitals for the insane, and in 1887 was once more elected to the Indiana Legislature.

GROSS (OF. *gros*, from Lat. *grossus*, thick). In law, at large; general; not limited or confined to a particular thing. Thus a right *in gross* is a right generally exercisable by a person, as distinguished from a right *appendant* or *ap-*

purtenant. The term is most commonly employed in connection with the class of rights known as incorporeal hereditaments, as easements and profits *à prendre* in the lands of another. Thus a right to take ice from a neighbor's pond to supply the domestic uses of the taker is a profit appurtenant to the premises of the latter, whereas a right to take ice *ad libitum* for any purpose is a profit in gross. Such a profit is a true real property right, which may be acquired by grant (q.v.) or prescription (q.v.), and which, when once gained, may be alienated or transmitted, like other real property, to the heir of the owner. Corresponding rights in the nature of easements, sometimes called easements in gross, are, however, not property rights, but mere licenses. See APPURTENANCE; EASEMENT; PROFIT À PRENDRE.

GROSS, grōs, CHARLES (1857—). An American historian, born at Troy, N. Y. He graduated at Williams College in 1878, went abroad for historical study, and took his doctorate at Göttingen in 1883. From 1884 to 1888 he continued his historical work in England, confining himself to researches in the constitutional history of that country. He returned to the United States in 1888 to become instructor in history at Harvard University, where in 1901 he became a full professor. His researches in constitutional history, which made him probably better known in Europe, and especially in England, than in America, include: *Gilda Mercatoria* (1883); *The Exchequer of the Jews of England in the Middle Ages* (1887); *The Gild Merchant* (1890); *Select Cases from the Coroner's Rolls* (1896); *Bibliography of British Municipal History* (1898); and *Sources and Literature of English History* (1900).

GROSS, grōs, FERDINAND (1849-1900). An Austrian author, born and educated at Vienna. He was an editor of the *Frankfurter Zeitung* (1879-81); the *Wiener Allgemeine Zeitung* (1881-86); and the publication entitled *Wiener Mode*, which he conducted for several years. His publications include: *Oberammergauer Passionsbriefe* (2d ed. 1890); "Blätter im Winde," in the *Bibliothek für Ost und West* (2d ed. 1888); *Die neuen Journalisten*, a comedy with Max Nordau (1880); *In Lachen und Lächeln* (1898); and translations from Coquelin, Daudet, Hervieu, Bisson, and others.

GROSS, grōs, SAMUEL D. (1805-84). A celebrated American surgeon, born in Pennsylvania. He was graduated in medicine from the Jefferson Medical College of Philadelphia in 1828; practiced his profession in Philadelphia from 1828 to 1833, and in Cincinnati, Ohio, from 1833 to 1840. From 1835 to 1840 he was also professor of pathological anatomy in Cincinnati College. He was professor of surgery, University of Louisville, Ky., from 1840 to 1850; professor of surgery, University of New York, from 1850 to 1856; and professor of surgery in Jefferson Medical College from 1856 to 1884. He was president of the American Medical Association in 1867. His contributions to literature, besides valuable translations of French and German works, included: *Diseases of the Bones and Joints* (1830); *Elements of Pathological Anatomy* (1839); and the valuable and comprehensive *System of Surgery* (6th ed. 1884).

GROSS, WILLIAM HICKLEY (1837-98). An American prelate, born in Baltimore, Md. He studied at Saint Joseph's College and joined the Redemptionists in 1857, becoming superior of the Order in 1871. Two years later he was appointed Bishop of Savannah, Ga., and in 1884 became Archbishop of Oregon.

GROSS ADVENTURE. In maritime law, a bottomry loan, so called because of the general character of the risk assumed. Such a loan contributes to the general average in case of loss. See BOTTOMRY BOND; AVERAGE, IN LAW.

GROSSBEEREN, grōs-bā'ren. A village in the Circle of Potsdam, Germany, 13 miles south of Berlin. Population, in 1900, 1351. It is noted as the scene of the Prussian repulse of the French advance on Berlin in 1813. The Prussians were commanded by Von Bülow; the French, under Oudinot, were driven back on the Elbe.

GROSSE, grō'se, JULIUS (1828-1902). A German poet, born at Erfurt and educated at Halle. For many years he was associated with the *Neue Münchener Zeitung*, afterwards known as the *Bayrische Zeitung*, and with the Schiller-Stiftung, of which he was secretary. His works include dramas, epics, songs, ballads, and novels. Especially noteworthy are his war-songs entitled *Wider Frankreich* (1870); the epic poems, *Das Volkramslied* (1889; 3d ed. 1897), *Gundel vom Königssee* (frequently dramatized), and *Das Mädchen von Capri;* the comic epics, *Pesach Pardel* (1871), *Hilpah und Shalum*, and *Der Wasunger Not* (1872); *Tiberius*, a drama (1875); *Ein Revolutionär*, a novel (2d ed. 1871); *Tante Carldora*, a novel; *Fortunat*, a drama (1895); *Die Novellen des Architekten* (i.-xx., containing *Nunzidta*, *Die Rache nach dem Tode*, 1896), and similar tales and romances.

GROSSE, THEODOR (1829-91). A German painter, born in Dresden. He studied at the Dresden Academy under Bendemann, whom he afterwards helped in the decoration of the Royal Palace and the Museum at Dresden. After several years in Italy Grosse returned to paint the eastern loggia of the Leipzig Museum. In 1867 he was made professor at the Dresden Academy. His other works include: "Leda with the Swan" (1852, Dresden Gallery); "Scenes from the Myth of Bacchus" (1877, foyer of the New Theatre, Dresden); "The Visit of the Three Angels to Abraham" (1863, City Museum, Leipzig); and "Arrival of the Souls in Purgatory," after Dante (1879, Dresden Gallery).

GROSSE (grōs) **ISLE.** An islet of Canada, in the river Saint Lawrence; 2½ miles long and 1 mile wide. It lies 29 miles below Quebec, and is the provincial quarantine station.

GROSSENHAIN, grō'sen-hīn. A town in the Kingdom of Saxony, Germany, on the Röder, 20 miles northwest of Dresden (Map: Prussia, E 3). It has extensive manufactures, including woolens, silk, machinery, buckskin, leather, cigars, hosiery, copper and zinc wares, soap, trimmed lumber, and bricks. Population, in 1890, 11,938; in 1900, 12,064. The town is mentioned as early as the tenth century, and was an important trading and military centre in the Middle Ages.

GROSSETESTE, grōs'tēst, ROBERT (c.1175-1253). A celebrated English prelate. He was born in Suffolk, studied at Oxford and Paris,

and, after returning to England, gained great reputation as a divine. He was the first rector of the Franciscan school at Oxford (1224). In 1235 he was elected Bishop of Lincoln, and set himself in most vigorous fashion to reform all abuses in his diocese. He was a man of great energy and strong character, but high-tempered and undiplomatic, and became involved in numerous controversies. One of the most famous was with no less a personage than Pope Innocent IV. himself. It was not unusual at the time for the Pope to appoint foreigners to vacant benefices in England, many of whom drew their revenues, but never came to the country. Grosseteste set himself against this abuse, and in 1253 with great firmness refused to induct the Pope's nephew, an Italian youth, into the first canonry that should be vacant in the Cathedral of Lincoln. He died October 9, 1253. Grosseteste was a friend of Simon de Montfort (q.v.), and a constitutionalist in politics. His learning was prodigious. Latin, Greek, Hebrew, French, mathematics, medicine, and music were among his attainments, and his knowledge of Scripture is particularly lauded. His influence on English life and thought lasted long beyond his time. He was a most voluminous writer. For his life, consult: Pegge (London, 1793), which contains a list of his works filling twenty-eight closely printed quarto pages; Brewer, *Monumenta Franciscana* (ib., 1858); Luard (editor), *Roberti Grosseteste Episcopi quondam Lincolniensis Epistolæ*, "Rolls Series" (1862); Perry (London, 1871); Stevenson (London, 1899).

GROSSETO, grōs-sā'tō. A town of Italy, in Tuscany, capital of the province of the same name, 90 miles south of Pisa. The cathedral, begun in 1294, was restored in 1855. In the Municipio is a collection of Etruscan antiquities (Map: Italy, F 5). A few miles to the northeast are the ruins of Rusellæ, deserted since the middle of the twelfth century, which was one of the twelve cities of the Etruscan Confederation. Grosseto markets cattle, horses, and grain. Population of commune, in 1901, 9599.

GROSSGLOCKNER, grōs'glŏk'nĕr. See GLOCKNER.

GROSSGLOGAU, -glō'gou. See GLOGAU.

GROSSI, grō'sē, TOMMASO (1791-1853). An Italian poet and novelist, born at Bellano. He studied law at Pavia, but, owing to his political ideas, was never able to rise in his profession. Manzoni mentions his poem "I Lombardi alla prima crociata" (1826) in his novel *I promessi sposi*. It attracted much attention because of its patriotic sentiment. Influenced by Manzoni's novel, Grossi wrote *Marco Visconti* (1834), which has often been translated. It was the beginning of the historical novel in Italy, and has always remained popular. His other works include *Ildegonda* (1814) and *Ulrico e Lida* (1834). Consult Cantù, *Vita ed opere di Tommaso Grossi* (Milan, 1854).

GROSS KIKINDA, grōs kik'in-dä. See NAGY-KIKINDA.

GROSSMITH, grōs'smĭth, GEORGE (1847—). An English actor, son of a journalist of the same name. In 1866 he became a reporter for the London *Times*, but soon turned to the stage, and about 1870 began his career as an entertainer with comic songs and the like. In 1877 he appeared in *The Sorcerer* at the Opera Comique, and he became very popular in other Gilbert and Sullivan operas, perhaps his best-known part being that of the Admiral in *Pinafore*, but in 1889 he returned for a time to the business of individual recitals and entertainments. Among his writings are: *The Reminiscences of a Society Clown* (London, 1888); *The Diary of a Nobody*, written with Weedon Grossmith (London, 1894), and numerous songs.

His brother, WEEDON GROSSMITH, the artist, is also a well-known actor, and his son GEORGE has gained some note as an actor and playwright.

GROSSWARDEIN, grōs'vär-dīn, or **NAGY-VÁRAD**, nŏd'y'-vä'rŏd. Capital of the county of Bihar, Hungary, situated in a beautiful plain on the Sebes Körös ('the rapid Körös'), 38 miles south-southeast of Debreczin, at the intersection of several railroad lines (Map: Hungary, G 3). It consists of the town proper and several suburbs, and is one of the most beautiful of Hungarian towns. It was formerly strongly fortified, and its ancient fortress, built on a neck of land between the Körös and Pecze, is still utilized as barracks. Grosswardein is the seat of a Roman Catholic and of a Greek Orthodox bishop, and has a number of notable ecclesiastical buildings, such as the large Roman Catholic cathedral, the Greek Catholic and Greek Orthodox cathedrals, the Church of Saint Ladislas, containing relics of the saint, and the palace of the Catholic bishop. Its educational institutions are very numerous, among them being a celebrated school of law. It has flourishing manufactures of pottery, earthenware, oil, spirits, and starch, and the district produces an excellent quality of wine. The popular sulphur springs of Hajó are situated six miles to the south. Population, in 1890, 38,557; in 1900, 47,365. Grosswardein is said to have been founded by Saint Ladislas in 1095, and was destroyed by the Tatars in the thirteenth century. It was held by the Turks from 1663 to 1692.

GROSVENOR, grō've-nĕr, EDWIN AUGUSTUS (1845—). An American historian, born in Newburyport, Mass. He graduated at Amherst in 1867, and at the Andover Theological Seminary in 1872, after which he took a year of post-graduate work in Paris. He was professor of history in Robert College, Constantinople, from 1873 to 1890, and professor of European history at Amherst from 1892 to 1899, when he was appointed to the chair of modern governments and their administration at Amherst. His writings include: *Constantinople* (2 vols., 1895); *The Permanence of the Greek Type* (1897); *The Hippodrome of Constantinople and Its Still Existing Monuments* (1889); and *Contemporary History of the World* (1898-99). In addition he has translated from the French Duruy's *History of Modern Times*, *General History of the World* (1898), and *Ancient History of the East* (1898-99); and from the modern Greek, *Andronike* (1897).

GROSVENOR GALLERY. A gallery for the exhibition of paintings and sculptures in Bond Street, London. The building was completed in 1877, at a total cost of £120,000. The façade is of stone in the Italian Renaissance manner, and the principal gallery is 104 feet long

by 35 feet wide and 36 feet high. The institution was founded by Sir Lindsay Coutts for the purpose of giving unofficial exhibitions of art, under conditions quite different from those usually employed. A jury of selection was dispensed with, and artists of reputation were invited to send any or as many of their works as they desired. The interior of the galleries was so decorated and the pictures so arranged that they might be seen under conditions which prevail in private houses. Many Royal Academicians contributed to these exhibitions, but the method of invitation and selection has attracted to them the artists at variance with the Academy, with the result that they represent a newer and less conventional character of English art. The exhibition begins May 1st, and is one of the events of the London season.

GROSVENOR HOUSE. The city residence of the Duke of Westminster, on Upper Grosvenor Street, London; formerly Gloucester House, built for the Duke of Gloucester, brother of George III. It contains the famous Grosvenor Gallery.

GROSVENOR SQUARE. A square in London, east of Hyde Park, noted for its literary and aristocratic associations. Bulwer Lytton spent his later years at No. 12, and Chesterfield House is on South Audley Street, which runs out from the Square. It was laid out in 1716, and many of its houses preserve before their doors the quaint ironwork of that period.

GROS VENTRES, grō′ väN′tr′ (Fr., great bellies). A name applied by French traders to distinct tribes, the Minitari or Hidatsa, on the Missouri, and the Arapaho, through misconception of the tribal designation, meaning 'the people who are hungry,' or 'beggars.'

GROT, grōt, Nikolai Yakovlevitch (1852—). A Russian philosopher, born and educated at Saint Petersburg. He successively occupied the chair of philosophy at Niezhin (1876-83), Odessa (1883-86), and Moscow (after 1886). In his numerous works (written chiefly in Russian), he endeavors to evolve a philosophical system, in which the will becomes a primary agent, dominating the external world. He was made editor of the periodical *Voprosy filosofi*, the first philosophical publication of its kind in Russia. His works in French include: *Nouvelle classification des sentiments* (1878), and *La causalité et la conservation de l'énergie* (1890). His more important publications in Russian are: *Psychology of the Feelings* (1880); *Philosophy as Art* (1880); *A Criticism on the Conception of Free Will* (1889); and *The Mission of Psychology* (1890).

GROT, grōt, Yakof Karlovitch (1812-93). A Russian philologist, born at Saint Petersburg and educated at Tsarskoë Selo. He held a professorship in Russian history and literature at Helsingfors from 1841 to 1853, and was then appointed to the same position at the Alexander Lyceum at Saint Petersburg, where he also was private tutor to the Grand Duke Alexander, afterwards Czar Alexander III. His principal works are: *Filologičeskya razyskanya* ("Philosophical Investigations") (3d ed., 12 vols., 1885); a critical edition of the work of Dershavin (9 vols., 1864-80); *The Correspondence of Catharine II. with Grimm* (1884); and a revised edition of the Russian lexicon of the Academy of Saint Petersburg (first 2 vols., 1891-92).

GROTE, George (1794-1871). An English historian of Greece, born in Kent in 1794. At the age of sixteen, after acquiring an elementary education in Latin and Greek, he entered the bank in which his father was a partner. He not only continued his classical studies, however, but gradually drifted into philosophy. He sided with the liberal school of thought, to which his creative mind made important contributions. After the passage of the Reform Bill of 1832, in favor of which he had zealously written and spoken, he entered the House of Commons as a representative of London. In the beginning of his public career he commanded a large following, but in time his advanced democratic ideas alienated all supporters with the exception of a few 'philosophic radicals.' He retired from Parliament in 1841, and two years later from the banking business, to give all his attention to study and writing. Before entering public life he had published (*Westminster Review*, April, 1826) a scathing criticism of Mitford's *History of Greece*, a recent work from an extreme Tory's point of view. It was partly to right the wrong done by Mitford to the spirit of free institutions, and partly to teach his countrymen a lesson in democracy, that Grote conceived and wrote his magnificent *History of Greece*. As early as 1822 he had begun planning the work, but his duties as statesman and banker compelled him to defer it till his retirement into private life. The first two volumes appeared in 1845, the twelfth and last in 1856. The work is pervaded by an intense enthusiasm for Greek democracy, which sometimes leads the author to underrate other forms of government; at the same time it aims to present all the known facts, that the reader may be able to form his own judgment. In 1865 he completed in three volumes a work on *Plato and the Other Companions of Socrates*. A thorough realist, the author could not fully appreciate the idealism of Plato, and yet these volumes have a value in presenting certain aspects of Platonic thought which down to his time had passed unnoticed. Grote immediately began a similar treatise on Aristotle, but did not live to complete it. Meantime he was taking an active interest in education. He was president of University College, vice-chancellor of the University of London—two great non-sectarian institutions—and a trustee of the British Museum. He died in 1871 at an advanced age. Consult: Mrs. Grote, *Personal Life of George Grote* (London, 1873); his *Minor Works, with Critical Remarks on His Intellectual Character, Writings, and Speeches*, ed. by Alexander Bain (London, 1873); his *Aristotle*, also ed. by Bain (London, 1872).

GROTEFEND, grō′te-fönt, Georg Friedrich (1775-1853). A German Orientalist and classical philologist, born at Munich and educated at Göttingen. From 1797 to 1821 he was successively pro-rector and con-rector of the gymnasium at Frankfort, whence he was called to become director of the lyceum at Hanover, which position he held until 1849, when he retired from active life. As a scholar Grotefend was broad, but was prevented by this very quality from becoming a strictly methodical investigator. His first work was *Anfangsgründe der deutschen Poesie* (1815), which was followed by a revision of Wenck's *Lateinische Grammatik* (2 vols., 1823-24). His contributions to the Old Italic dialects are of considerable importance. They comprise:

Rudimenta Linguæ Umbricæ (1835-38); *Rudimenta Linguæ Oscæ* (1839); *Geographie und Geschichte von Altitalien* (1840-42). Grotefend's chief importance, however, lies in his contribution to the decipherment of Old Persian inscriptions. (See CUNEIFORM INSCRIPTIONS.) He increased the number of certainly known characters from three to eleven, and approximated the real value of several more. He made his first study in this subject in 1802, and published his chief work on it in 1837, *Neue Beiträge zur Erläuterung der persepolitanischen Keilschrift*. In addition to his other studies, he was one of the first to turn his attention to the difficult problem of the interpretation of the Lycian inscriptions.

GROTESQUE (Fr., from It. *grottesco*, grotesque, from *grottesca*, style of painting found in ancient crypts, from *grotta*, cavern, from ML. *grupta, crupta*, from Lat. *crypta*, crypt). A style of classical ornament, so called in the thirteenth century from its having been rediscovered in the excavations made in the baths of Titus and other ancient Roman buildings. This light, fantastic style was much in favor during the Renaissance. It abounds in all kinds of transformations, from the animal to the vegetable, and mingles all the natural kingdoms in the most fanciful and picturesque confusion. The name grotesque thus came by degrees to mean a fanciful combination of natural ideas as applied to ornament.

GROTH, grōt, KLAUS (1819-99). A German poet, and the first writer of prominence to employ 'Plattdeutsch,' or Low German, as a literary medium, born at Heide, in Ditmarsh, the western part of Holstein, Prussia. He studied at the Teachers' School in Tondern, and then secured a position as a teacher of girls in his native place, devoting his spare time to the study of philosophy, mathematics, and the natural sciences. Finally, his health giving way, he retired to the island of Fehmarn, in the Baltic, where he remained five years, and where most of his poems were written. In 1853 he went to Kiel, then traveled through Germany and Switzerland, and after a two years' sojourn at Bonn, where he received the doctor's degree, took up his residence in Dresden. In 1857 he returned to Kiel, where he became a tutor in German language and literature, and in 1866 was made professor, which position he held until his death. His fame rests chiefly on his *Quickborn* (1853, 25th ed. 1900), a collection of poems in the Ditmarsh dialect. His works have been collected and published in four volumes (Kiel, 1893). For an estimate of his works, consult Eggers, *Klaus Groth und die plattdeutsche Dichtung* (Berlin, 1885).

GROTH, PAUL (1843—). A German mineralogist. He was born at Magdeburg, and was educated at Freiberg and Berlin. After lecturing at the mining school and at the University of Berlin, he successively occupied the chair of mineralogy at Strassburg and Munich, where he was appointed custodian of the royal mineralogical collections. In 1877 he founded at Leipzig the important periodical *Zeitschrift für Krystallographie und Mineralogie*. His writings, chiefly on mineralogy and crystallography, include: *Tabellarische Uebersicht der Mineralien nach ihren krystallographisch-chemischen Beziehungen geordnet* (3d ed. 1889); *Physikalische Krystallographie* (3d ed. 1895); and *Grundriss der Edelsteinkunde* (1887).

GROTIUS, grō'shī-ŭs, HUGO, or DE GROOT (1583-1645). A Dutch publicist. He was born at Delft, April 10, 1583. His father, Jan de Groot, was burgomaster of the town, and also curator of the University of Leyden. In his eleventh year Hugo entered the University of Leyden, where he studied under Joseph Scaliger. In his fifteenth year he took his degree. In the following year he accompanied Olden Barneveldt, the grand pensionary, on his embassy to France, where Grotius's talents and conduct gained the favor of Henry IV. On his return he began practice as a lawyer, and conducted his first case at the bar of The Hague in 1599. In 1607 he was appointed fiscal general, and in 1613 council pensionary at Rotterdam. The disputes between the Remonstrants and their opponents were now at their height in Holland; Olden Barneveldt was the protector of the former, and Grotius also supported them by his writings and favor. These theological strifes had a political significance as well, and in consequence both Olden Barneveldt and Grotius were arrested, tried, and condemned by the dominant party under Prince Maurice. (See BARNEVELDT.) Olden Barneveldt was beheaded in 1619, and Grotius sentenced to imprisonment for life in the Castle of Loevenstein. He escaped, however, by the contrivance of his wife.

For some time Grotius wandered about in destitute circumstances in the Catholic portions of the Netherlands, and finally escaped to France. Here his straitened circumstances continued in spite of the fact that Louis XIII. bestowed upon him a pension of 3000 livres, since but a part of it was paid, and in 1631 it was withdrawn. A friendly letter from Prince Frederick of Orange induced him to return to his native country; but, by the intrigues of his enemies, sentence of perpetual exile was soon passed upon him. He removed to Hamburg, and while there he received invitations from the Kings of Denmark, Poland, and Spain; but the protection promised him by the Chancellor Oxenstiern, and Queen Christina's taste for literature, induced him to enter the Swedish service in 1634. He held the position of Ambassador at the French Court (1635-45). His reception by the Queen on his return to Sweden was flattering; but the literary dilettantism of Christina's Court did not suit so serious and solid a scholar. Besides, the climate of Sweden did not agree with him, and he was anxious to spend the evening of his life in his native land. In consequence, he sent in his resignation of office to the Queen, who, when she found that nothing could induce him to stay, presented him with a sum of 10,000 crowns and some costly plate, besides placing at his disposal a vessel to conduct him down the Baltic to Lübeck. A storm compelled him to land on the coast of Pomerania. While proceeding toward Lübeck, he fell sick, and died at Rostock, August 28, 1645.

To the talents of a most able statesman, Grotius united deep and extensive learning. He was a profound and enlightened theologian, perhaps the best exegete of his day, a distinguished scholar, an acute philosopher, a judicious historian, and a splendid jurist. His metrical translations from the Greek authors also display

superior poetical powers; he was one of the best modern writers of Latin verse, and likewise composed poems in Dutch. In spite of his wandering and checkered career, Grotius found time to write a great variety of works. The first was the *Mare Liberum*, in which he defended the freedom of the Dutch East India trade. His chief work, however, is that entitled *De Jure Belli et Pacis*, which has been translated into all the principal languages of Europe. It may be considered as the basis of international law, and has been much used as a text-book on the subject. Among his other works we may mention *Annales et Historiæ de Rebus Belgicis* (Amsterdam, 1657), written in a style that rivals Tacitus for concise and pointed power; *Annotationes in Vetus Testamentum* (Paris, 1644); *De Satisfactione Christi*; and *De Veritate Religionis Christianæ* (Leyden, 1627), remarkable for its clear arrangement, vigorous logic, and eloquent style. Consult: Butler, *Life of Grotius* (London, 1826); De Vries, *Huig de Groot en Maria van Reigersbergen* (Amsterdam, 1827); Creuzer, *Luther und Hugo Grotius* (Heidelberg, 1846).

GRO'TON. A town in New London County, Conn., on the Thames River, opposite New London, and on the New York, New Haven and Hartford Railroad (Map: Connecticut, G 4). It contains the Bill Memorial Library, and has large ship-building yards. The government is administered by annual town meetings. Population, in 1890, 5539; in 1900, 5962.

Here occurred, on September 6, 1781, what has been called the 'Massacre of Fort Griswold.' One hundred and fifty Americans stubbornly resisted an attack of about 800 Tories under Benedict Arnold, who finally forced their way into the fort, and, maddened by the prolonged resistance, butchered the greater part of the survivors after their surrender. Of the 150, 85 were killed and 65 wounded, 35 mortally. A monument marks the site of the fort. Consult: *History of New London County* (Philadelphia, 1882), and an article, "The Massacre of Fort Griswold," in *Magazine of American History*, vol. vii. (New York, 1880).

GROTTAGLIE, grôt-tä'lyâ. A city in the Province of Lecce, Italy, 12 miles northeast of Taranto (Map: Italy, M 7). It has chalk and clay quarries, and markets grain, fruit, wine, oil, cotton, and cattle. Population of commune, in 1881, 9431; in 1901, 11,274.

GROTTE, grôt'tâ. A town in the Province of Girgenti, Sicily, 13 miles northeast of the city of Girgenti. Sulphur-mining is the principal industry (Map: Italy, H 10). Population of commune, in 1881, 8808; in 1901, 11,039.

GROTTGER, grôt'gẽr, ARTHUR VON (1837-67). A Polish painter, born at Ottyniowice (Galicia). He studied in his own country as a boy, and then went to Vienna, where he was a pupil of Karl Blaas, and afterwards to Munich, where he studied under Kaulbach. While in Vienna he began to make his reputation as an illustrator. About 1865 he went to Italy, and a year afterwards to Paris. There he executed his cycle of twelve cartoons, "In the Valley of Tears," exhibited at the Exposition of 1867, and afterwards bought by the Emperor of Austria. They show his skill in composition. His "Warsaw" (seven scenes, 1861), "Poland" (nine scenes, 1863), "Lithuania" (six scenes, 1863), present a history of Poland profoundly patriotic and profoundly sad. Such works as these, together with the "Meeting of Sobieski and Leopold I." (1859), have made him a popular painter in Poland.

GROUCHY, groo'shē', EMMANUEL, Marquis de (1766-1847). A French marshal. He was born at Vallette in the Department of Seine-et-Oise, September 5, 1766. He entered the French Army at the age of fourteen, and by 1789 had risen to the rank of captain in the royal bodyguards. In spite of birth and training, he threw in his lot with the republicans, and left the royal guard for a line regiment. In 1792 he was a colonel of chasseurs and camp marshal. His services in Savoy and in La Vendée (1793) were rewarded with the rank of brigadier-general (1794); but the decree of the Convention against the nobles forced his retirement for a time. He was reinstated in command in 1795, and took part, as second in command to Hoche, in the Irish expedition (1796), and entered Bantry Bay. In 1798 he fought under Joubert in Italy, and later distinguished himself under Moreau in Piedmont. His public protest against the coup d'état of the Eighteenth Brumaire did not prevent Napoleon from utilizing his services, and he took part in the campaign on the Danube, distinguishing himself at Hohenlinden (1800). After the Peace of Lunéville Grouchy was made inspector-general of cavalry and employed on various important missions, becoming one of Napoleon's most trusted followers. He was prominent in all the Emperor's campaigns. During the Russian expedition he commanded a cavalry division at Borodino, and in the retreat led the 'sacred squadron' of officers forming the Imperial bodyguard. Nevertheless, he was refused the command of an army corps in 1813, but at the close of the year accepted a lesser post, and after fighting bravely against odds, was severely wounded at the battle of Craonne (1814). The Bourbon restoration resulted in Grouchy's loss of rank and banishment, and on Napoleon's return from Elba Grouchy was one of the first to offer his services. He suppressed the Royalists under the Duke of Angoulême, and received a marshal's baton as his reward. He received command of a division of the French Army sent against Wellington and Blücher. With a force of 35,000 men and 100 guns, he was ordered to operate against Blücher and the Prussians after their defeat at Ligny. These orders he obeyed too literally, for, in spite of the entreaties of his generals, he remained before Wavre, assailing Blücher's rear-guard of 15,000 men, while the rest of the Prussian army marched to the field of Waterloo. The absence of Grouchy's army resulted in Napoleon's defeat, and caused the Emperor to exclaim: "I would have gained the day but for his stupidity." Grouchy did all he could to repair his fatal error, but the cause of the Empire was lost, and he resigned his command under the walls of Paris. Under the Second Restoration he was proscribed, and passed five years in exile in the United States, residing in Philadelphia. Both parties in France reviled him, and an effort was made to condemn him to death. At last, in 1819, he was restored to his titles and estates, though not given the rank of marshal. He lived in retirement near Caen, constantly defending his conduct in 1815 in pamphlets and

letters. After the July Revolution of 1830 he was recognized as a marshal of France, and resumed his seat in the Chamber of Peers. He was forced, from time to time, to defend himself against the attacks of his former generals of staff, and died May 29, 1847, before he was fully rehabilitated. His most important writings appear in the *Fragments historiques relatifs à la campagne et à la bataille de Waterloo* (Paris, 1830). Consult, also: *Memoires du maréchal Marquis de Grouchy*, edited by his grandson (Paris, 1873-74); the histories of the campaign of 1815 by Jomini (Paris, 1841), Charras (Brussels, 1857), and Quincet (Paris, 1862).

GROUND (AS. *grund*, ground, earth, foundation). In painting, the material with which the canvas or panel is covered preparatory to painting, also called *priming*. Canvases are known as absorbent or non-absorbent, single-primed or double-primed, and are thus prepared to meet the taste of the artist, both as regards their character and their color. The Italians of the Renaissance used white grounds in paintings on wood, but with the increased use of canvas they preferred a dull red. The Dutch and Flemings chose light tints, varying from white to gray. This is also the present practice. The preparation of grounds was formerly considered of great importance. Of contemporary painters Burne-Jones is said to have often prepared his grounds, and then set them aside for years to dry and get thoroughly set. Most modern painters, however, attach less importance to priming. A good uniform ground of light tint is generally acceptable, as the covering of the pigments is now, in all competent work, of so great a body and thickness that the ground counts for little or nothing in the final processes of a painting. For the ground in engraving and etching, consult the articles on these subjects.

GROUND-ALMOND. See CHUFA.

GROUND-ANNUAL. In the law of Scotland, an annual rent or annuity paid by the owner of land to a creditor, or to the vendor of the land. Thus, when a vendor sells his land, and instead of taking a lump sum for the price, prefers a sum by way of a perpetual annuity or rent, he conveys the land in fee to the disponee or purchaser, subject to this ground-annual, which is a burden on the lands forever after. The vendor or creditor is called the ground-annualer, and if the ground-annual is not paid he is entitled as a remedy to poind the ground, i.e. seize all the goods, whether of the owner or his tenants, which are found on the lands, and pay himself, or he may sue the debtor. But he cannot, as a ground-landlord can do in England, poind the goods of the debtor's tenants to a greater extent than the current term's rent or arrears due by them. The ground-annual is the Scotch equivalent of the rent charge reserved by the vendor of land in England, and of the fee-farm rent of American law, while poinding is the common-law remedy of distress (q.v.).

GROUND-BEETLE. A beetle of one of the largest and most important families of beetles, Carabidæ, so called because they live on or beneath the surface of the soil. About 12,000 species have been described in this family, and 1100 of them occur in North America. Most of them are predaceous and carnivorous, and both adults and larvæ are swift runners. Their colors are dull metallic blue, green, brown, or black, and they are often ornamented by longitudinal ridges and rows of punctures. Both adults and larvæ feed mainly upon insects, slugs and snails, but also eat dead animal flesh. Some forms eat young growing corn, young seeds, and ripe strawberries. The family is generally useful to agriculture, for its various members feed on such destructive forms as the potato-beetle and its larvæ, the June beetle and cutworm. Certain species even ascend trees in search of canker-worms and plum-curculios. Seashore forms feed on the beech-flea (Gammarus). A number of blind species inhabit caves both in Europe and America (see CAVE ANIMALS), and other small blind forms dwell under large stones. Not one of this last class has ever been found above ground, so that each colony may have been confined for generations under its respective stone. Certain other species live under stones at the seashore, which are covered at each high tide, and come out only when the tide is low. Still others occur in the nests of termites; these so strongly resemble the termite queens that one may easily mistake the one for the other, and they probably prey upon the termites. Some forms produce a loud noise by raising the tip of the abdomen and rubbing it against a file on the wing-cases. These are the 'squeakers' that are sold in Covent Garden market, London. Some forms are aquatic, and others live in wet sands of rivers and pools. Certain adult and larval forms lie awaiting their prey in holes in the ground, from which they bound out when the victim is sufficiently near. The overpoweringly fetid odor of a small species (*Nomius pygmæus*) is described by Barrows (*Proc. Assoc. Econ. Ent.*, Washington, 1897). In the United States the ground-beetles can only be confused with the darkling beetles (Tenebrionidæ) of California: the ground-beetles have five-jointed tarsi, while the darklings have only four joints in the hind tarsi. The 'searcher' (*Calosoma scrutator*) is one of our commonest ground-beetles. It is violet, blue, and green, with red margins on the wing-covers, and sometimes ascends trees in search of caterpillars. The bombardier-beetle (*Lebia grandis*), which closely resembles the bombardiers and is frequently an enemy of the potato-beetle, and the genus Harpalus, are other common ground-beetles. The last named are black, and feed to a considerable extent on cutworms.

GROUND-CHERRY. See PHYSALIS.

GROUND-CUCKOO. See COUCAL.

GROUND-DOVE, or GROUND-PIGEON. A pigeon of terrestrial habits. Several genera have short and rounded wings, with much inferior power of flight to pigeons in general; their legs are longer, and their feet rather adapted for walking than for grasping. They are little arboreal in their habits, but live mostly on the ground. Many of them run very quickly. They have not in general much brilliancy of plumage, but among them are the beautiful bronzewings (q.v.) of Australia. In the Southern United States, Bermuda, and the West Indies the name 'ground-dove' is especially applied to the diminutive little dove Columbigallina passerina, a plain-colored but handsome bird, which is common in those regions. These doves are less than seven inches long, are almost always on the ground (though they roost at night in trees), and are

common in the roads, where they show little fear of man. They are generally seen in pairs, and seem greatly attached to each other.

GROUNDHOG. (1) The name in the Southern United States of the marmot (*Arctomys monax*), better named 'woodchuck' (q.v.). (2) In South Africa, the aardvark (q.v.).

GROUND-HORNBILL. A hornbill of the African subfamily Bucoracinæ, characterized by hollow casques, and by habits and an organization suited to terrestrial life. Two species are known, a northern (*Bucorax*, or *Bucorus*, *Abyssinicus*), and a southern, the 'bromvogel' of the Boers (*Bucorax Cafer*). Both are large birds, the Abyssinian being 3½ feet long, and of stout build, with a casque open in front. The southern species has the casque closed. Both are wholly black, except the wing-quills, which are white. They go about in small flocks, and are fearless, but when too much alarmed fly into trees for safety. They eat anything they can find—fruits, insects, crayfish, small reptiles, mice, and snakes. They are noted for their antipathy to snakes and their cunning in overcoming them. When a snake is discovered, they approach it, holding their wings stretched out and flapping the reptile with them until it is induced to seize a feather. Then all the birds attack it and peck it to death. If the snake advances, the bird threatened folds its wings as a shield in front of it, and by manœuvres and assaults soon overcomes even the death-adder. They place their nests in cavities or broken trees. The natives of South Africa hold this bird in superstitious abhorrence, its alleged foretelling of storms being the least of its sins in their sight. See HORNBILL.

GROUND-IVY, *Nepeta Glechoma.* A plant of the natural order Labiatæ, a native of Europe, widely introduced in America, which grows in the dry soils of waste places, plantations, hedges, etc. It has a creeping stem, kidney-shaped crenate leaves, and axillary blue flowers in threes. The plant is stimulant, aromatic, and is used in pectoral complaints. A tea prepared from the leaves is in great repute among the poor in many places. The leaves were formerly used in England for clarifying and flavoring ale, which was then called gill-ale, from gill-over-the-ground, an old name of this plant; but this use has been discontinued since the introduction of hops.

GROUND-LAUREL. See ARBUTUS, TRAILING.

GROUNDLING. A small loach (*Leuciscus tænia*) of English rivers and ponds, keeping close to the bottom. See LOACH.

GROUNDNUT. A term variously employed, to denote the seed of the peanut (*Arachis hypogæa*) and the tubers of certain umbelliferous plants, especially *Apios tuberosa*, also called earthnut. See PEANUT.

GROUND-PINE. See CLUB-MOSS.

GROUND-PINK. See PHLOX.

GROUND-RAT, or **GROUND-PIG.** A burrowing, rat-like rodent (*Aulacodus swinderianus*), of South and West Africa. It is two feet long, and has very harsh, bristly hair, flattened, grooved, and brown in color. It is a near relative of the spiny rodents of tropical America, such as the coypu, hutia, and others of the family Octodontidæ.

GROUND-RENT. In England, the rent reserved on land leased for a long term of years for improvement. The additional value imparted to the land by the erection of buildings and other improvements constitutes this a safe and convenient form of investment. In England and in some parts of the United States the remedy of distress (q.v.) exists in favor of the ground-landlord. Unless otherwise provided in the lease, the improvements constitute fixtures and become the property of the owner of the soil.

The practice of hiring ground for building purposes exists in the United States, and the law is similar to that of England on this point. But in most of the States there is no distress of the tenant's chattels in case of failure to pay the rent. The landlord will simply have an action for the amount of rent due, or he may dispossess the tenant and resume possession of the premises himself.

In Pennsylvania the term ground-rent is employed for rent charge or fee-farm rent to describe the rent reserved to the grantor of an estate in fee simple.

GROUND-SEA. A West Indian name for a *roller*. The sea rises in long swells or billows, usually from a northerly direction, which increase in height as the shore is approached, and break there with great force. The ground-sea may occur in a calm and otherwise smooth sea, and with no indications of a previous or coming gale. It has been suggested that they are due to 'northers' blowing farther to the north. In the Gulf of California and other parts of the world, particularly in the tropics, similar phenomena occur.

GROUND-SLOTH. See GANODONTA; MEGATHERIUM.

GROUND-SNAKE. Any of the small, worm-like serpents of the North American genus Carphophiops, which are the most lowly of Colubridæ, and represent the typical forest burrowers of Central and South America. They are harmless little snakes, about the size of a slate-pencil, and with no apparent neck, and are likely to be found under stones, or beneath or inside of decayed logs. Frequently they also force their way under the bark of trees, an operation in which they exert considerable muscular effort. The species most commonly seen, and to be found in all the South Central States, is *Carphophiops amœnus*, which is glossy, opalescent, chestnut-brown above, and bright salmon color beneath. Another species (*Carphophiops vermis*), the 'ground-worm' of the lower Mississippi Valley, is large and purplish-brown in color above, while below it is broadly flesh-colored.

GROUND-SQUIRREL. A group of squirrels, differing from the true squirrels in the possession of cheek-pouches, in having a more slender body and shorter legs, and in living chiefly on the ground, and seldom climbing trees to any considerable height. They are of small size, are longitudinally striped on the back and sides, are extremely active and restless, and emit a peculiar chipping sound. The striped spermophile or 'gopher' (q.v.), so troublesome in the Northwest, and the chipmunk (q.v.) are familiar American examples. See Plate of GOPHERS, ETC.

GROUNDSWELL. A long smooth swell, frequently occurring along a coast where the ocean bed is not far below the surface for a long

distance from the land. While often found in fair or calm weather, it is due to deep-water disturbances from heavy winds. Where the water is very shoal the swell or roller breaks as it rolls in, forming a series of breakers which smooth down again before reaching shore, if the flat is of great extent.

GROUND-TACKLE. Anchors and chains, and tackles, ropes, etc., used in working the anchors are included by the general expression *ground-tackle*. See ANCHOR.

GROUND-THRUSH. A pitta (q.v.).

GROUP (Fr. *groupe*, from It. *gruppo*, *groppo*, cluster, knot, borrowed from the Germanic; cf. OHG. *kropf*, Ger. *Kropf*, AS. *cropp*, Eng. *crop*). In the fine arts, a collection of figures or objects related to each other, and to a general design, so combined as to produce a harmonious whole. For the principles of grouping, conventional and otherwise, see COMPOSITION.

GROUPER (probably from Sp. *garrupa*, from the American Indian name). A general name for the fishes of the genus Epinephelus, typical of the group Epinephalinæ, a section of the sea-bass family Serranidæ. It is the largest, most widely distributed, and most important genus of the Serranidæ. They are mainly of large size, and occur frequently in all the tropical seas, where they are valuable for food. About a dozen species are known on the southern coast of the United States, and about the West Indies, where various ones are called 'cabrilla,' 'cherna,' 'guasa,' and 'mero' by Spanish-speaking fishermen, 'hind' in the British Islands and at the Cape of Good Hope, and 'jewfish' (q.v.) in Florida. They have a robust, powerful form, and are usually greenish-gray, or orange-brown, varied with many blotches and bars, and with dark fins—on the whole very handsome fishes. The best known and most common American species is the red grouper (*Epinephelus morio*), which ranges from Virginia to Brazil. It averages about two feet in length, and is generally gray, but reddish about the mouth, this color deepening and spreading with age. It remains near the bottom, not far from shore, feeds on crabs and small fish, and when caught offers no resistance. It is an important food-fish, but not of the first quality in flavor. Another much smaller species (*Epinephelus maculosus*) is the 'red hind' or 'cabrilla,' so constantly seen in the markets of Havana. The common Bermudan grouper (*Epinephelus striatus*) is larger; and the 'rock hind' or 'cabra mora' (*Epinephelus Adscensionis*), which is also known on the African coast, ranks highest of all as a table fish. The black grouper of Key West (*Mycteroperca bonaci*), also called 'aguaji,' represents an allied genus, several species of which are called 'groupers,' 'rockfish,' or 'bonacis,' and are large and important food-fishes. The great jewfish or warsaw (*Garrupa nigrita*) is also sometimes denominated 'black grouper.' See GUASA; JEWFISH; ROCKFISH; SEA-BASS; SCAMP; and Colored Plate of PHILIPPINE FISHES.

GROUPS (in mathematics). See SUBSTITUTION.

GROUSE (a false singular, after the analogy of *louse*, *mouse*, as singulars of *lice*, *mice*, from *grice*, *grise*, *greese*, gray, from OF. *griesche*, gray, moor-hen, variant of *gris*, gray, from OHG. *gris*, Ger. *greis*, gray). A game-bird of that section of the rough-footed gallinaceous family Tetraonidæ which includes the larger forms; one of the Tetraoninæ. They are distinguished among birds of their class by their completely feathered shanks (except Bonasa); also by the fact that feathers fill the nasal groove and conceal the nostrils. The toes usually are naked, but are feathered to the claws in ptarmigans (q.v.), and they have pectinations of scales along the edges, which are deciduous. The tail-feathers are from 16 to 18 and sometimes even 22 in number; and in shape the tail is acute, rounded, or forked. The orbital region usually is somewhat bare, and there is above the upper eyelid a naked stripe, marked by short, fringe-like processes. Many genera have an inflatable air-sac on the side of the neck. Often the sides of the neck are further adorned by elongated feathers. The plumage is thick, soft, and handsome, but gay colors and patterns are absent; blacks, purples, and dark greens occur in some forms, but variegated browns, reds, and grays prevail in most species, and there is usually a considerable difference in color and ornamentation between the sexes and some seasonal changes; one genus (Lagopus) turns white in winter. (See PTARMIGAN.) The grouse, as a rule, are birds of the forest, but some genera are found in open regions only, and the ptarmigans chiefly inhabit mountain-tops. All, however, seek their food principally and nest wholly on the ground. The food consists of seeds, berries, buds, leaves, insects, worms, small snails, and so on, varying with region, season, and opportunity. The nest is a rude bed of leaves, twigs, and the like, and from six to fifteen eggs are laid, which are brownish and spotted—among the ptarmigans very heavily. All except the ptarmigans are polygamous, and the cocks indulge in demonstrative courtships (see CAPERCAILLIE), make various sounds with their wings (see below), and contest fiercely for the possession of their harems, as is the habit of most gallinaceous birds. They trust mainly to concealment for safety, and remain motionless on the ground or perched in a tree until fear overcomes their prudence, when they spring away with a startling *whirr* of the wings and astonishing speed. Hence trained dogs are needed to find and flush them, and much skill in shooting is required to bring them down in flight, but some of the forest-haunting species will not leave the supposed safety of a tree-perch and are easily killed. They are favorites of sportsmen wherever they occur, and all are most excellent eating, except the few whose flesh is tainted by their bitter or resinous food. Great numbers are shot for the markets in all northern countries. A brief account of the principal species follows:

CAPERCAILLIE AND BLACKCOCK. The largest of all grouse is the European capercaillie (q.v.). Next in importance to it in Europe ranks the blackcock or heathcock (*Tetrao tetrix*), which is the bird to which the name 'grouse' primarily applies, although in popular English speech the red grouse or moor-fowl is meant. On the Continent it occurs both in mountainous and marshy countries, as far south as the Apennines. It abounds in most parts of Scandinavia, Russia, and Siberia, and is abundant in Great Britain wherever there are extensive moors or favorable spaces for it. The male, which is much larger than the female, and sometimes weighs four

COMMON GAME BIRDS

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1 VIRGINIA RAIL - RALLUS VIRGINIANUS
2 COMMON QUAIL - COLINUS VIRGINIANUS
3 CALIFORNIA QUAIL LOPHORTYX CALIFORNICUS
4 SNIPE GALLINAGO DELICATA
5 RUFFED GROUSE BONASA UMBELLUS
6 PHEASANT PHASIANUS COLCHICUS

pounds, is a shining bluish black, with a conspicuous white bar on the wings, and a mixture of black and white on the legs; there is a piece of bare scarlet skin over the eye; the outer feathers on each side of the tail are elongated and curve outward, giving it a very peculiar appearance. The female, called 'grayhen,' is of a rust-color, darkest on the upper parts, everywhere barred and mottled with a darker color; the tail is straight and even at the end. The young males resemble the females in plumage. It is a gregarious bird, the different sexes, however, in winter generally keeping in flocks by themselves; and, where they are well protected, they often venture into old turnip and stubble fields to feed.

Red Grouse. This, the ordinary 'grouse' of Great Britain, the shooting of which, beginning on August 12th, is so important a part of the British sportsman's year, is, properly speaking, a ptarmigan, and is described under that title.

Ruffed Grouse or 'Partridge.' The best-known American grouse is the bird called 'partridge' in the North and 'pheasant' in the South, but it is properly the ruffed grouse (*Bonasa umbellus*). This familiar and highly prized game-bird, the flesh of which is incomparably superior to that of any other grouse, is found throughout North America from the Atlantic to the Pacific, from Virginia and northern Georgia to Alaska. It is nearly a foot and a half long, and the plumage is handsomely variegated with gray, red-brown, and black. The tail is composed of eighteen feathers, and is crossed near its tip by a broad band of black or brown. On each side of the neck is a tuft of broad, glossy black feathers. These grouse live in woodland, where their nests are made on the ground at the base of a tree or shrub. The eggs are buff-colored, and a dozen, more or less, are laid. (See Colored Plate of Game Birds accompanying this article.) The hazel grouse (*Bonasa betulina*) of Europe and Asia is a nearly allied species.

One characteristic of this species—its 'drumming'—is known to almost every one, yet the method of it is widely misunderstood. The sound is produced by the male only, and is most frequent and vigorous in the spring, when it may be regarded as a challenge to other cocks and for the entertainment of the hens; but as it is heard also in summer, and especially in autumn, it cannot be wholly a sexual expression. It may be only an expression of vigor. The manner in which the long, muffled roll, resounding to a great distance through the woods, is produced, was long a puzzle, or most fancifully explained. It was at first supposed to be a vocal effort, whence comes the generic name Bonasa (from *bonasus*, a bull). The true explanation is that the bird sits crosswise upon the chosen log, resting upon the back of the tarsi, its tail spread horizontally, and its head drawn back. "The wings are then raised and stiffened, and drumming commences by a slow, hard stroke with both wings downward and forward; but they are stopped before they touch the body. The rapidity of this motion is increased after the first few beats, when the wings move so fast that only a semicircular haze over the bird is visible, the rapid vibration causing the rolling noise with which the sound terminates." So says Henshaw, and Coues and other field ornithologists confirm the statement.

Prairie-Chickens. The Eastern prairie-chicken, or pinnated grouse (*Tympanuchus Americanus*), is a trifle larger than the ruffed grouse. The general color of the plumage is rufous, with bars and crossings of black; the tail is short and rounded. The male has neck-tufts of narrow feathers, the largest of which are five inches long; he is more remarkably adorned with two loose pendulous wrinkled patches of skin extending along the sides of the neck for two-thirds of its length, capable of inflation with air, and when inflated resembling in bulk, color, and surface middle-sized oranges. This grouse chiefly inhabits dry open districts, from northwestern Ohio, Indiana, and Kentucky westward to central Kansas and the Dakotas. It was at one time abundant on the Western prairies, but has always become rare as a district has become cultivated and populous, notwithstanding laws enacted for its preservation. It has almost disappeared from the State of Kentucky, where it was at one time so extremely abundant that children were constantly employed to prevent its depredations in the cultivated fields, and multitudes were shot and trapped merely to be thrown away. It congregates in flocks in winter, which break up into smaller parties in spring. The males have many combats at the approach of the breeding season. Their voice is a low 'tooting' or 'booming.' They strut, after the manner of turkey-cocks, with wings let down to the ground, and neck-feathers erected. Certain spots, known as 'scratching-places,' seem to be specially appropriated for their displays and combats, and there considerable numbers often meet about daybreak and disperse again after the sun is up. The food of the pinnated grouse consists of seeds, berries, the buds of trees and bushes, insects, and the like.

A very closely allied species, the American heath-hen (*Tympanuchus cupido*), formerly dwelt in favorable localities in the Middle States and southern New England. Long Island and Cape Cod were its strongholds. It was long confounded with the more widely distributed prairie-chicken, and is now extinct, except a small band on Nantucket Island, which is dwindling away in spite of such protection as can be given them. In 1890 less than 200 were living on Nantucket and Martha's Vineyard, and in 1900 it was thought that less than 100 remained. See Extinct Animals.

The 'prairie-chicken' of the Northwest is more strictly to be called sharp-tailed grouse (*Pediocœtes phasianellus*), of which there is a northern and a southern race. It is easily distinguished by the extra long middle pair of tail feathers and the darker plumage—clear dusky black above, with no buff about the head. The back is variegated with transverse zigzags of yellowish brown, and there are many white spots on the wings; below, the plumage is white, thickly marked with triangular spots of drab. The sexes are alike. In the southernmost parts of their range they associate with the prairie-chicken, and vary their habits northward only as their environment changes. The northern variety extends from the Saskatchewan Valley to the borders of the Arctic regions.

Sage-Grouse. This species (*Centrocercus urophasianus*), called in old books 'cock-of-the-plains,' is a very large grouse which inhabits the sage-brush districts of the Western United States, feeding upon the bitter buds and leaves so that its flesh is inedible to civilized palates, though consumed by the Indians, who formerly

captured it in large numbers with nets. The constant use of soft food has deprived this species of an effective gizzard, and it never feeds upon the grain of the farmers who have invaded its district. Its plumage is dense and soft, the prevalent color yellowish brown, which is beautifully mottled and varied with darker tints. The tail, of 20 feathers, is very long, and much graduated. On each side of the neck is a large bare space, capable, when the bird struts, of being inflated into a hemispherical sac. The female is smaller and of less showy plumage than the male and is destitute of the neck-sacs.

Wood-Grouse. The remaining species of American grouse are denizens of forests. A very widely distributed form is the Canada grouse or 'spruce-partridge' (*Canace Canadensis*), a Western variety of which is called Franklin's grouse or 'fool hen.' It is plentiful throughout the forests of Canada, from Maine to Alaska, and when disturbed takes refuge in trees, whence a flock may be shot, one by one, without scaring the others away. In winter it feeds mainly on the leaves and young sprouts of the spruce, which taint its flesh. Its plumage is distinctly barred above with plumbeous and black; beneath it is black, with a white border to the throat and white across the breast and on the sides. The females show a duller mixture of yellowish orange, gray, and black. The eastern and western (Franklin's) varieties may be distinguished by their tails: that of the former is rounded and tipped with rufous, while that of the latter is nearly even, black to the tip, and has the upper tail-coverts (see Bird) broadly tipped with pure white. A Siberian grouse (*Canace falcipennis*) is closely allied to this. A still larger Western wood-grouse is the 'blue,' 'dusky,' or 'pine' grouse (*Dendragapus obscurus*). It approaches the capercaillie in size, and may be regarded as the American analogue of the blackcock. Its general color is blackish brown; the wings are lighter and the tail large, rounded, and composed of eighteen or twenty feathers. They keep in the coniferous forests for the most part, and occur throughout the mountain regions from Colorado to central California and northward. For the Arctic grouse (Lagopus), see Ptarmigan.

Bibliography. Standard works of ornithology and field sports. The fullest general account of American grouse is contained in Coues, *Birds of the Northwest* (Washington, 1874). Consult also: Leffingwell (and others), *Shooting on Upland, Marsh, and Stream* (Chicago, 1890); Sandys and others, *Upland Game Birds* (New York, 1902); Lloyd, *Game Birds and Wildfowl of Sweden and Norway* (London, 1867); Morris, *British Game Birds* (London, 1891). See Plate of Grouse.

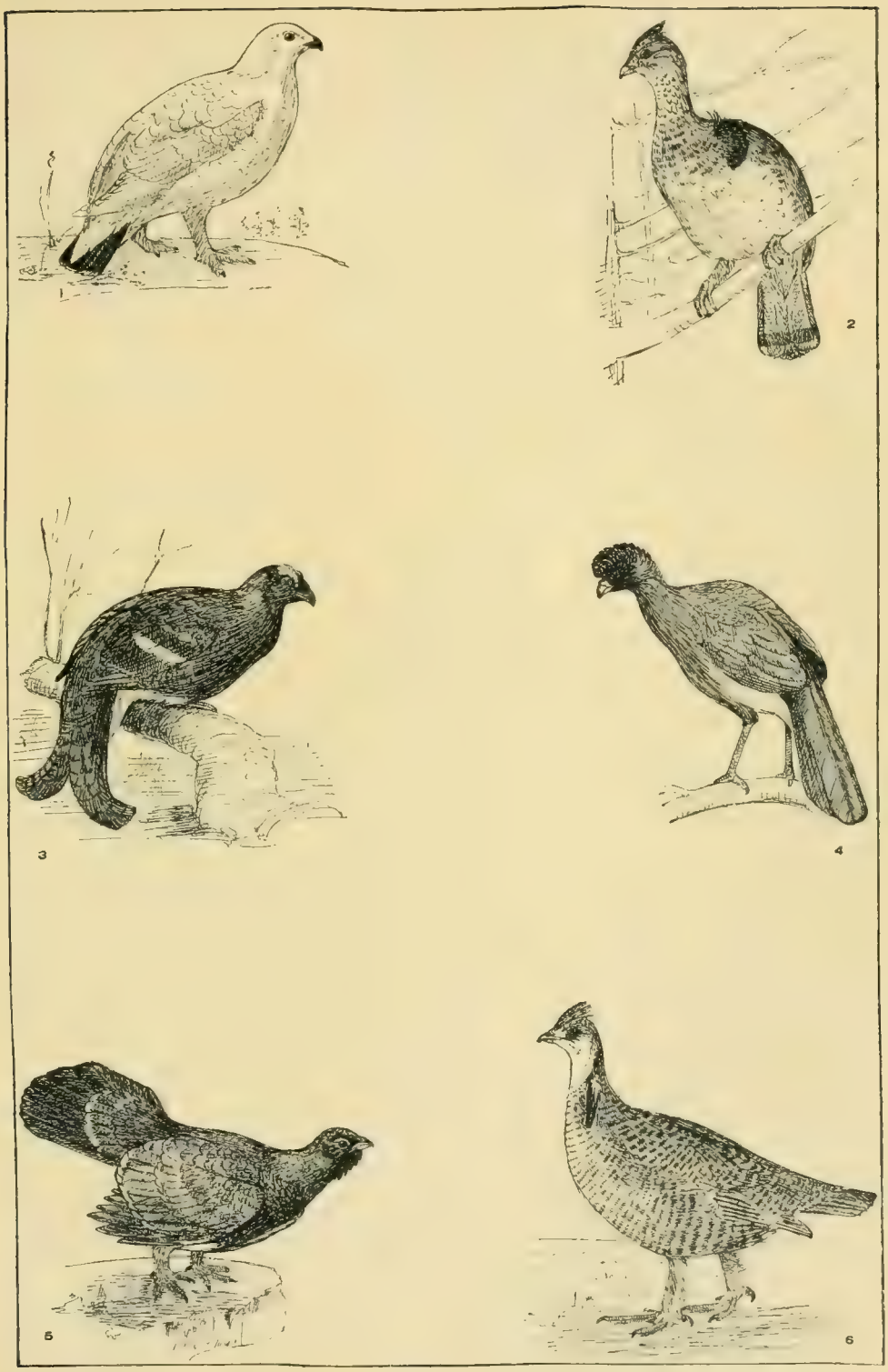
GROUSE'S DAY, Saint. An English sporting term, used of the twelfth of August, when the shooting season opens.

GROUSSET, grōō'sâ', Paschal (1844—). A French politician and author, born at Corte in Corsica. He studied medicine in Paris, but immediately took up journalism, wrote scientific articles for *L'Etendard* and *Le Figaro* under the name 'Docteur Blasius,' and began to write fiction under the pseudonym 'Léopold Virey.' He joined Henri de Rochefort in the management of *La Marseillaise* in 1869, and in January, 1870, quarreled with Prince Pierre Bonaparte and sent two seconds to answer his challenge. One of these, Victor Noir, was killed by the Prince. This deepened Grousset's opposition to the Empire, and he attacked it bitterly in *La Marseillaise*, and was condemned to heavy fines and repeated imprisonments. He took part in the insurrection of March, 1871, was elected a member of the Commune, and took charge of foreign affairs; but on his attempt to leave Paris in June was arrested and deported to New Caledonia. He escaped with Rochefort and others (1874), went to England, acted as London correspondent of *Le Temps*, under the name 'Philippe Daryl,' and returned to Paris in 1881. Defeated in the elections of that year, he was chosen Deputy in 1893 and reëlected in 1898. His works include: The political sketches, *Le bilan de l'année 1868* (1869), *La conspiration du général Malet* (1869), and *Les origines d'une dynastie, le coup d'état de Brumaire an VIII.* (1869), as well as the autobiographic *Les condamnés politiques en Nouvelle Calédonie* (with Jourde, 1876); notes of travel and life abroad, *La vie partout* (1884-88); *Scènes de la vie de collège dans tous les pays* (1881-91); translations of Stevenson's *Treasure Island* and of Mayne Reid's novels; and *L'héritier de Robinson* (1884); *L'épave du Cynthia* (with Jules Verne, 1885); *Le capitaine Trafalgar* (1886); *Le secret du mage* (1890); and *Atlantis* (1896). 'Tiburce Moray' is another of Grousset's pseudonyms.

GROVE, Sir George (1820-1900). An English engineer and musical critic, born at Clapham. After studying at the grammar school there he was articled to Alexander Gordon; worked at Napier's factory in Glasgow; was employed in the building of Morant Point Lighthouse in Jamaica (1841), and of Gibb's Hill Light in Bermuda (1845); and then worked on the Britannia Tubular Bridge over Menai Strait. In 1850 he was secretary to the Society of Arts, but resigned this post (1852) to become secretary of the Crystal Palace. Here he first made an effort to educate English musical taste, especially for Beethoven and the Romantic German School. In 1867 he traveled to Vienna with Arthur Sullivan and discovered the part-books of Schubert's music to *Rosamunde*. His abilities as a critic of music brought him into connection with the Macmillans. He was editor of their magazine from 1868 to 1883, and of the valuable *Dictionary of Music and Musicians* (1879-89), and wrote *Beethoven and His Nine Symphonies* (1896). For twelve years he was director of the Royal College of Music. He was knighted in 1883 and made Commander of the Bath in 1894. His work in biblical geography was also important. He wrote many articles for Smith's *Dictionary of the Bible* (London, 1864); assisted Stanley in his *Sinai and Palestine* (New York, 1865); and was influential in the promotion of the Palestine Exploration Fund. Consult Graves, *The Life of Sir George Grove* (London, 1901).

GROVE, Sir William Robert (1811-96). An English physicist, born at Swansea. He graduated at Brasenose College, Oxford, in 1832; was called to the bar in 1835, and began the practice of law, but left it for the study of physics. He was professor of experimental philosophy in the London Institution from 1840 to 1847, was a member for some time of the council of the Royal Society, and in 1847 received the Royal Medal for a paper on "The Gas Voltaic Battery." Returning

GROUSE, ETC.



1. WILLOW PTARMIGAN (Lagopus albus); winter plumage.
2. RUFFED GROUSE (Bonasa umbellus); male.
3. BLACK GROUSE (Tetrao tetrix); male.
4. CRESTED GUAN or CURASSOW (Crax alector); male.
5. CAPERCAILZIE (Tetrao urogallus); male.
6. PRAIRIE CHICKEN (Tympanuchus Americanus); male.

to the law, he became prominent in the South Wales and Chester circuits. He became a justice of common pleas in 1871, and in the following year was knighted. Afterwards he became judge of the High Court of Justice, from which position, however, he retired in 1887, and thereafter until his death devoted himself to scientific investigations. In 1842 he delivered a lecture on "The Progress of Physical Science," in which he propounded for the first time the doctrine that the so-called forces of nature, such as heat, electricity, etc., are not essentially dissimilar; that they are nothing but different modes of motion, different and mutually convertible forms of something which is called *energy*, and of which the most essential characteristic is its indestructibility. Grove was thus one of the first to grasp and enunciate what Faraday has called "the highest law in physical science which our faculties permit us to perceive—the conservation of force." These views were further developed in the famous essay on *The Correlation of Physical Forces* (1846). Grove published several works on subjects connected with electricity, containing the results of his acute experimental investigations. He also made important improvements in electrical apparatus, and invented a well-known galvanic battery which bears his name. See ELECTRICITY.

GROVE CITY. A borough in Mercer County, Pa., 60 miles north of Pittsburg; on the Pittsburg, Bessemer and Lake Erie Railroad (Map: Pennsylvania, A 2). It has a Carnegie Library ($30,000) and is the seat of Grove City College, opened in 1884. There are manufactures of carriages, gas-engines, foundry products, brooms, etc. The borough owns and operates its water-works. Population, in 1890, 1160; in 1900, 1599.

GRO'VER, CUVIER (1829-85). An American soldier, born in Bethel, Maine. He graduated at West Point in 1850, served on frontier duty at Fort Leavenworth, Kan., until 1853, took part in the Northern Pacific Railroad Expedition of 1853-54, and was again stationed at various frontier forts until the outbreak of the Civil War. He was made a brigadier-general of United States volunteers in April, 1862; participated in the Peninsular campaign; was brevetted lieutenant-colonel on May 5th for his conduct at the battle of Williamsburg; and on May 31st was brevetted colonel for gallantry at Fair Oaks. He took part in the battle of Glendale, and his brigade was especially distinguished for valor at the battle of Manassas. From December, 1862, until July, 1864, he was in command of a division of the Nineteenth Corps, Department of the Gulf, and directed the right wing of the army in the siege of Port Hudson, La. In October, 1864, he was brevetted major-general of volunteers for his conduct at the battles of Winchester and Fisher's Hill; and his gallantry at the battle of Cedar Creek and in the Shenandoah campaign earned for him on March 13, 1865, the brevet of brigadier-general in the United States Army. He was also brevetted major-general on the same day for services during the whole war. He subsequently returned to frontier duty, served as assistant inspector-general of the Fifth Military District in 1869-70, and while on sick leave died at Atlantic City, N. J.

GROVER, LA FAYETTE (1823—). An American lawyer and politician. He was born in Bethel, Maine, graduated at Bowdoin College, and in 1850 was admitted to the bar in Philadelphia. He began practice in Salem, Ore., in 1851, and was elected prosecuting attorney of the Territory in the same year. In 1852 he was auditor of public accounts, and a member of the Oregon Legislature, in which he served, in all, three terms, being Speaker in 1856. He fought in the Indian wars of 1853 and was United States commissioner to settle spoliation claims against the Government. He was a member of the Oregon Constitutional Convention in 1857, and was the first representative of the State in Congress. He was chairman of the Democratic State Central Committee from 1866 to 1870, and was Governor from 1870 to 1877, when he resigned to enter the United States Senate, in which he served one term.

GROVES, SACRED. Groves associated with worship or religious rites. Such groves are found among many peoples. In the Authorized Version of the English Bible, the word 'grove' occurs frequently as the translation of the Hebrew *'ashērāh;* this is generally admitted to be an error, and in the Revised Version the word is transferred without attempt at translation (see ASHERA). In two passages (Gen. xxi. 33; I. Sam. xxii. 6, margin) 'grove' represents the Hebrew *'ēshel*, tamarisk (cf. I. Sam. xxxi. 13). A shrine may have been connected with the tree mentioned in the last passage, and in the first it is stated that Abraham planted a tamarisk in Beersheba "and called there on the name of Jehovah." There is mention of an oak by the sanctuary at Shechem (Joshua xxiv. 26) and at Bethel (Gen. xxxv. 8); certain other passages are by some interpreted as referring to trees (Authorized Version, 'plain'; Judges iv. 11; ix. 6, 37). The tree occurs frequently on Assyrian sculptures.

Groves played an important part in connection with the religion of the ancient Greeks and Romans. To nature-worshipers, they seemed peculiarly appropriate sites for temples and oracles. The Greeks placed groves and forests under the protection of the god Pan, and tenanted them with nymphs called dryads or hamadryads. Some of the earliest Greek oracles were supposed to be given at Dodona through the rustling of oak-leaves. The famous Grove of Academe was a public garden outside of Athens, where Plato taught. Perhaps the most famous sacred grove of the ancient Hellenic world was Daphne, situated in the environs of Antioch on the Orontes, and consecrated by Seleucus Nicator to the worship of Apollo. The Romans derived the foundation of their religion from Numa, as of their political life from Romulus. Numa was believed to have received his religious instruction in a grove from a nymph Egeria. In this spot, thus consecrated by divine presence, he erected, according to tradition, a temple to the Camenæ. Seventeen miles southeast of Rome was a place Nemi, where a famous temple was erected in a grove to Diana. See CAMENÆ; DAPHNE; DODONA; DRYADS; NEMI.

GROVE'TON. See BULL RUN, SECOND BATTLE OF.

GROW, GALUSHA AARON (1823—). An American politician, born at Ashford, Conn. He graduated at Amherst College in 1844, and was

admitted to the bar in 1847. Four years later he was elected to Congress from Pennsylvania and continued to be a member of that body until 1863; the first half of the time as a Free Soil Democrat, the last as a Republican. From July 4, 1861, to March 3, 1863, he was Speaker of the House of Representatives. He was president of the International and Great Northern Railway from 1871 until 1876, a position which made it necessary for him to live in Texas. In the latter year, however, he returned to Pennsylvania. He declined the Russian mission in 1879, and since 1894 has been Congressman at large from his State.

GROWTH (from *grow*, AS. *grōwan*, Icel. *grōa*, OHG. *gruoan;* connected with AS. *grœne*, Ger. *grün*, Eng. *green;* cf. also Icel. *grōþr*, *grōþi*, growth). Increase in size or volume. It is not to be confounded with development, which follows or accompanies growth and has to do with the unequal growth of parts of the organism, involving an increasing unlikeness of the different parts, i.e. a differentiation or specialization of the body. Hence development is the formation of a complex from what was originally a simple whole, as seen in the development of the flower or the chick, which both grow and unfold or develop.

Inorganic Growth. Growth, whether that of minerals, of our earth, the solar system, or even of the universe, is primarily due to the action of cosmic energy and of motion. Our solar system, the fixed stars and planets, have had a history, have grown, have developed. Geological history is a process of growth; the continents may be said to have gradually grown to their present size and shape. This is illustrated by the growth or simple increase in size of mineral or inorganic bodies. Crystals, under favorable conditions, grow by the addition of particles to the outside. There is a certain limit to their growth, and crystals are of different sizes—they take on a definite shape, related to the physical and chemical characters of the mineral substance. Verworn, however, thinks the contrast made between the crystal and the organism is 'unfortunate.' He states that "as regards its physical characteristics the living substance of organisms in its essentials ought to be compared with a liquid," and he goes on to state that "liquids grow by intussusception, i.e. if a soluble body be added to a liquid, e.g. salt to water, the latter dissolves the former and stores the molecules of the soluble body by diffusion between its own molecules, that is, there is here exactly the same process as in the growth of the organism." All this goes to show that growth or increase in size, together with some degree of development up to a certain stage (certainly not up to the cessation of power of reproduction), takes place in the inorganic world.

Organic Growth. As living beings fundamentally differ from mineral bodies, so growth in plants and animals is inherently different. Even organic growth is defined as increase in volume, but this does not go far enough. Living organisms are compounds or proteids of mineral matter, forming protoplasm, and they grow by adding to the substances forming their bodies similar substances or food, which is taken within the body by interstitial deposit (intussusception), and these are digested and assimilated. This causes an increase in the volume or bulk of the body. Organic growth is fundamentally a physico-chemical process plus a form of constructive energy which we are unable to comprehend. In our present ignorance we invoke vital force, 'growth force,' or 'bathmism,' words which do not help us to understand what is behind the phenomenon of increase in volume. Besides simple increase in bulk, there is, as Ryder states, a process of rearrangement, further subdivision of and addition to the material basis of the organism. Growth, also, according to Ryder, proceeds everywhere by "adding to its substance at a rate which corresponds exactly with the rate at which the cube of the dimensions of the growing body is everywhere being increased. All growth is accompanied by movement, for as a cell increases in volume it becomes expanded." "Hence," says Verworn, "growth-movements are common to all living substance, but they take place so slowly that they can scarcely be followed with the eye." That the phenomena of growth are powerful sources of energy is exemplified by the well-known fact that trees growing out of crevices in the rock are able by their roots to force apart huge masses of stone. See Mechanics of Development.

Correlation of the Volumes and Surfaces of Organisms. It has been pointed out by Leuckart and by Herbert Spencer that as organized unicellular bodies increase in bulk, their surfaces become proportionately less, and that this elementary rule of growth very probably leads to the necessity for segmentation or subdivision of the original cellular body, "owing to the unfavorable conditions which continuous growth establishes between the organism and its surroundings, thus developing unfavorable conditions for nutrition, respiration, and consequently for metabolism and growth in general." (Ryder.) But, as Ryder claims, there are "supplementary but equally important principles connected with the *geometrical ratios* with which the forces of growth, reproduction, and metabolism are simultaneously operative during the development, growth, and evolution of organic types"; and he claims that "without resort to another type or set of adjustments which living beings have effected in relation to the outer world, the present development of organized resistance, and even of animal motion and mentality, would in all probability have been an impossibility."

The primary form of living beings, as the lowest plants and animals, is that of a sphere, the spherical shape being due to gravity and surface-tension. But Ryder points out that this shape is one "which is itself unfavorable for growth, with a proportionate and concomitant acquisition of new surface, since of all forms of bodies it is the very one which can contain the greatest amount of matter within the least amount of surface." Hence any departure from this primitive spherical form "will increase the proportional amount of enveloping surface in respect to the volume of enveloped matter." Hence, first, the tendency of organs to extend indefinitely in the form of a cylinder, with rounded or hemispherical ends, which becomes more and more attenuated as its length is increased, as in the nerves, or blood-vessels; and, secondly, the formation of flattened disk-like bodies, such as the blood-corpuscles.

Why do the nerves, blood-vessels, etc., grow slender and branched? Ryder answers this ques-

tion by saying that the indefinite stretching or flattening of a mass achieves the same thing "as splitting it up into a great many slender bars, and placing these end to end, or, as splitting up the mass into a great many thin slices, and joining these edge to edge. In both cases a great gain of surface is accomplished. Now if a body branches rapidly, it does the same thing as is done when it is split up into a great many slender bars; namely, it increases its surface in a ratio corresponding exactly to the rate at which the splitting or branching takes place." This is what the vascular system has done. The branching of the blood-vessels, with their innumerable ramifications, "is nothing more than a physiological response, developed in a geometrical ratio, to a correspondingly rapid increase in the volume of the organized matter to be metabolized." So with the nervous system, "the extreme attenuation of the terminal and central interrelative fibres given off by the ganglion cells of the nervous system means a gain of surface in proportion to mass which is nowhere else paralleled by any active constituent tissue of animal bodies." The enormous development of the irritable surface is, he adds, correlated with the extreme irritability of the nervous system. This is exemplified by the tenacity of the nerve terminals of the auditory organs and the other organs of sense; while it is the most attenuated structures known to the histologist which are the most irritable, as cilia, flagella, etc. This subject is further illustrated by the stretching of plasma into threads, as the pseudopods of many protozoans, the branches and filaments or flattened leaf-like forms of gills, as well as the roots and branches of plants. Thus organisms higher than spherical protozoa have, after life began, proceeded, during their growth in volume, to develop surfaces according to this rule of geometrical progression.

Growth as a Function of Cells. As organisms are one or many-celled, and as the many-celled plants or animals arise from a single cell (the seed or egg), growth is primarily a function of cells. During growth the cells undergo rapid multiplication, which causes the body to increase in weight, this being determined by the number of cells and their average weight. Increase in age affects the different cells unequally, and hence some cells are dividing while others are not. In the mature body a minority of the cells are in process of division, while the majority are not. (Minot.) Very few observations have been made as to measurement of the growth of animals. Semper measured that of the pond-snail; but those of B. A. Gould and of H. P. Bowditch on man are more extensive and reliable. In animals, according to Minot, the rate of growth in weight for man, and for some few other animals, increases for about half the period of growth, then remains approximately constant for a short time, and finally slowly diminishes until it becomes zero.

Factors Concerned in Growth. These are chiefly external, such as abundance of food and other conditions of existence, as heat, light, etc. Hatschek assumes that in growth the simple molecule of living proteid continually attracts elements to itself from the food. Growth is more rapid in a well-fed animal or plant. Development of the higher organisms is usually introduced by a period of rapid cell-division with almost no growth. This is followed by a period of rapid imbibition of water during which the tissues are stretched, and growth occurs with great rapidity. Later still, the cell-walls thicken, intercellular substance is deposited, and the dry weight slowly increases. This is the special period of assimilation and secretion. In the development of the frog the percentage of water rises to 96 when half a month old, and then falls slowly. At six weeks from fertilization the human embryo consists of 97.5 per cent. water, but at birth the proportion of water has fallen to 75 per cent., and in adult man it is 66 per cent. The growth processes may be classified as 'transitory,' in which growth is followed by a return to the former size, and 'permanent' or developmental, in which there is a persisting enlargement which plays an important part in development. Transitory growth may be illustrated by the enlargement of those cells which cause the leaflets of the sensitive plant to turn; this enlargement is only temporary. Developmental growth is illustrated by the increase of the embryonic plant. Growth phenomena may also be classified as 'diffused' or 'localized.' Diffused growth affects the entire individual or many of its parts, whereas in localized growth the process is confined to a limited region. In early development the whole animal swells by diffused growth; later, the separate organs enlarge as a result of localized growth. Although cell-division usually accompanies growth, it is in no way the cause of growth. The curve of growth is obtained by joining with a line the tops of ordinates erected from a horizontal base-line at equal time intervals, the height of the ordinates being proportional to the volume of the organism. A study of these growth-curves shows that absolute increments of size are at first small, rapidly increase to a maximum, and then decline to zero. This decline to zero is not a necessary property of protoplasm, but it is an adaptation to the limited size which is advantageous to most animals.

Various external agents influence the rate of growth as follows: (1) *Chemical Agents.*—The assimilative and secretory are chemical processes. They require certain materials to work upon. These materials are the food of organisms. The principal elements found in the body are carbon, oxygen, nitrogen, calcium, phosphorus, potassium, sodium, chlorine, magnesium, sulphur, silicon, and iron, which enter the body in various combinations, while each plays a definite rôle. Since phosphorus is especially abundant in embryonic tissue, its peculiar importance for growth is indicated. Potassium is probably of great importance in imbibition. Iron is essential in the early processes of cell-division. Besides the inorganic elements, organic food is essential to the growth of animals; various chemical agents that are not built up into the organic body may accelerate growth by acting as a stimulus. Certain poisons do this.

(2) *Water.*—The imbibition of water is an important growth process. Developing embryos are usually found in moist situations.

(3) *Density of the Medium.*—The rapidity with which water is imbibed depends largely upon the osmotic pressure of the medium, and this is determined by its density. Regeneration of marine animals is hastened in dilute sea-water, retarded in a concentrated solution. Pond-or-

ganisms develop with abnormal slowness in a salt solution.

(4) *Motor Agents.*—Quiet facilitates growth, and after a wound excessive growth takes place along the cut edge.

(5) *Light.*—Light may retard or accelerate growth in different cases. Its effect is usually unfavorable to growth in young plants, and the growing tissue of vegetative plants is usually protected from the sun's rays. So, likewise, among animals the embryo is usually sheltered from the light by being carried in the maternal body, covered by egg-shells, or placed in dark places. Acceleration of growth by light, on the other hand, takes place in certain aquatic algæ, especially diatoms, and in certain aquatic embryos (tadpoles, fish-embryos, and young pond-snails). In these processes of retardation and acceleration not all the component rays of white are equally effective. Thus, in general, the long-waved rays have no more effect than darkness except in forming starch. It is the active rays which retard the growth of aërial organisms, and it is the actinic rays which accelerate the growth of aquatic organisms.

(6) *Temperature.*—Heat has a well-known effect on the rate of growth. For every organism there is a temperature to which it is attuned—at which growth takes place faster than at any other. As we lower the temperature the rate of growth gradually and slowly diminishes; as we raise the temperature the rate of growth diminishes more rapidly. The temperature of maximum growth (called the optimum) is closely related to the temperature to which the organism is normally subjected. See EVOLUTION.

(7) *Extent of the Medium of Volume.*—Among the most remarkable factors determining the extent of growth of an animal is the amount of space it has to move in. It is well known that small trout occur in small brooks and large ones in greater streams. Some years ago Karl Semper reared pond-snails in vessels containing different quantities of water. He found that there was a direct relation between the volume of the water and the length of the shell at the end of eight weeks. This experiment has since been repeated with care, and the result confirmed. The explanation of this phenomenon is difficult. It may be that there is a self-adjustment of the size of the snail to the space at its command. In fact, in all the phenomena of growth, the phenomena of adaptation are striking.

As to the external factors which influence growth, we are very ignorant. Morgan speaks of a few isolated cases. From experiments in cutting off the tail of a minnow, in which particular regions are held in check while others grow at the maximum rate, the results demonstrate some sort of a formative influence in the new part. "An excellent example of an internal factor," Morgan says, "is found in the interrelations of the parts of the organism to each other." A most important factor in the growth of organisms of the present day is that of heredity (q.v.), for the existing forms of life are the descendants of innumerable generations. Growth, development, and reproduction are now proceeding in grooves as it were, or along more or less definite paths, in accordance with long-established laws, and heredity undoubtedly affects the mechanism of growth. As Cope has well said: "In bathmism we see the resultant of innumerable antecedent influences, which characterize the life of living beings."

When a worm multiplies by budding or by self-division, the new part grows or begins to form in a zone near the end of the body. This zone is called the 'growing zone,' or the 'zone of proliferation,' and here the nuclear substance is abundant in proportion to the enveloping protoplasm. This zone is still more definite in the embryos of all arthropods. It is situated between the penultimate and the last segment of the body, and from this zone the new segments arise and grow. It is also interesting to observe, as Packard states, that in striped or spotted caterpillars, as well as in lizards, the change in the origin and shape of the markings appears to originate at what corresponds to the zone of formative cells, and then passes forward toward the head.

Growth is related to *longevity* (q.v.). That men, says Minot, are larger than rabbits, because they grow for a longer period is a common observation; but the facts tabulated by him show the curious result that the average daily increments in growth are nearly the same in man and rabbit. "On the other hand, rabbits attain a larger size than guinea-pigs, not because they grow longer, but because they grow much faster." The rate of growth in guinea-pigs and rabbits is not very different, as was to be expected in so nearly related animals; but it is sufficient to produce a great inequality in the final size, because the effect of the difference is accumulated, like compound interest on capital. The rate in man (0.02 per cent.) is only $\frac{1}{25}$ of the rabbit's (0.5 per cent.). This comparison renders it still more strikingly evident that the larger size of man depends on the greater duration of growth." The percentages given by Minot may, he says, be called the specific coefficients of growth. Together with the duration of growth, they determine the ultimate size of the organism. As a rule the larger an animal, the longer it lives, and this, adds Minot, confirms the idea that in large animals senescence proceeds more slowly than in smaller ones. See SENESCENCE.

Growth is related to great *size*. The question why the elephant is so much larger than the mouse, the whale than the porpoise, cannot be answered at present; but from the foregoing statement the causes appear to be connected with nutrition and longevity, as well as the conditions of the environment. Why the moa (Dinornis) or the epiornis, whose legs were as thick as a man's hat, attained such a colossal size compared with the sparrow, is apparently due to its mode of life and its environment. Birds which have the full use of their wings, and are constantly on the wing, live faster than running birds, and are of small or moderate size. The ancestors of the running bird, as the ostrich and moa, were undoubtedly flying birds, with keeled sterna; but owing to the isolation of the moa on the New Zealand Islands, and to the absence of mammalian and other enemies, it is evident that by lack of exercise, by food being abundant in the soil, and by not being compelled to fly after their prey, they gradually increased in bulk and weight. Here we see a direct relation between the conditions of life and change of habits, and size. Turtles are slow livers, and are known to attain a very great age.

The matter of longevity and also of size may also be dependent on the nature of the cells. Minot states that the most characteristic peculiarity of advancing age, of increasing development, is the growth of protoplasm in proportion to the size of the nucleus. "The possession of a relatively large quantity of protoplasm is a sign of age"; that is, the amount of protoplasm in the cell is large in maturity and old age as compared with the nucleus. He refers to Bütschli's investigations, which indicate that in bacteria a nucleus is present and very large, while the protoplasm enveloping it is minimal in amount. This fact should be correlated with the extraordinary power of proliferation or reproduction in these organisms, indicating that a small proportion of protoplasm is essential to rapid growth. This presence of a minimum amount of protoplasm is a 'young' character, a characteristic of youth. Certain sea-fishes, as also starfishes, continue to grow for very long periods, and their cells have the 'young' character, containing very little protoplasm. On the other hand, there are certain types which do not grow beyond a definite size, and in these, as for instance among the insects, the cells are characterized by having a great deal of protoplasm in proportion to the nucleus. In this connection it should be remembered that May-flies and dragon-flies in the Carboniferous period were gigantic in size, their wings expanding from ten to twenty inches, and throughout geological history we have cases of types becoming colossal before becoming extinct. Thus overweight and oversize may be a sign of weakness and decrepitude—of senescence of the type. As the result of prolonged observation on guinea-pigs, weighing them regularly at fixed ages from birth until maturity, Minot shows that even from the time of birth there is a steady loss of vitality; the animal begins, so to speak, to die as soon as it is born. The amount of protoplasm in the cells increases with age. This loss of growth power is equally demonstrated in the case of man, and presumably of all mammals. The passage from youth to old age is called 'senescence' (q.v.), and the procreation of the young 'rejuvenation' (q.v.).

BIBLIOGRAPHY. H. Spencer, *Principles of Biology* (New York, 2d ed., 1900); Minot, "Growth as a Function of Cells," in *Proceedings of Boston Society of Natural History*, vol. xx. (Boston, 1879); "On Certain Phenomena of Growing Old," address, *American Association for the Advancement of Science* (Salem, 1901); "Senescence and Rejuvenation," in *Journal of Physiology*, vol. xx. (1891); Ryder, "The Correlations of the Volumes and Surfaces of Organisms," *Contributions to the Zoölogical Laboratory, University of Pennsylvania*, vol. i., part i. (Philadelphia, 1893); Verworn, *General Physiology* (New York, 1899); Davenport, "Effect of Chemical and Physical Agents upon Growth," in *Experimental Morphology*, part ii. (New York, 1899), and the literature there referred to.

GROWTH (in plants). Three ideas are involved in the term 'growth' as applied to plants: First, increase in size; second, formation of new material; third, attainment of maturity. Of these three, increase in size is the predominant one; but in special cases of growth, no appreciable increase in size occurs, although there may be the formation of new material, and even, on attainment of maturity, a rather complex structure. Again, organisms may increase in size and attain mature form without the formation of any new living material, the whole course of development depending merely upon the absorption of water, and the rearrangement of material already present. The plant passes through three phases of growth, which are by no means sharply distinguishable from one another, and are established merely for convenience.

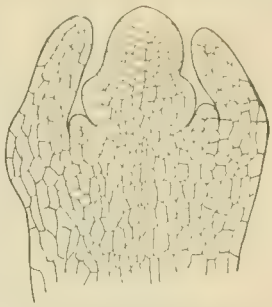


FIG. 1. Longitudinal section of the growing point of the shoot of horsetail (*Equisetum arvense*). The apex is occupied by a tetrahedral cell, which is continually dividing. Lateral leaves, and just above them the oldest lateral growing points, are forming.

THE FORMATIVE OR EMBRYONAL STAGE. Every plant begins its history as a single cell. The growth and differentiation of this one cell may comprise its whole life history, which will then be correspondingly brief; or, the first cell may divide again and again, and its daughter cells continue dividing, until the plant is constructed of a mass of cells. These may remain practically alike, or they may differentiate into unlike groups of cells, each group constituting a tissue. (See HISTOLOGY.) In this case its life history will be more complex, and will proceed as follows: At first the cells are all similar in size and form, and each will show these characteristics: (1) Granular protoplasm without any water-spaces (vacuoles); (2) a relatively large nucleus, its diameter often more than half that of the entire cell; and (3) a relatively thin wall surrounding the cell. Since this is the condition of the cells in every young (embryo) plant, and since in this condition cells are able to produce new cells by division and to give rise to new organs, this stage is named the embryonal or formative stage of growth. As the cells grow older, some or all of them pass by imperceptible degrees into the second and third phases of growth, while others remain in the formative stage. Those which persist in this stage are to be found at the ends of the axes, at which place they constitute the so-called growing

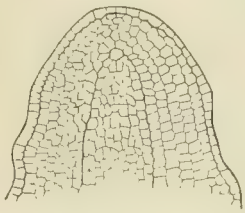


FIG. 2. Longitudinal section through the growing point of the shoot of a seedling dicotyl. A group of cells, instead of one, as in equisetum (Fig. 1), occupies the apex.

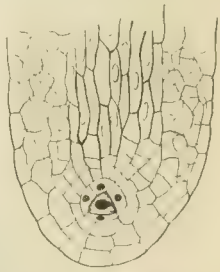


FIG. 3. Longitudinal section of growing point of root from selaginella. The triangular cell near the tip is the apical cell, dividing continually to form (behind) the tissues of the root-shaft, and (before) the root-cap.

point (Figs. 1, 2, 3). In the seed-plants, the tip of each rootlet and the tip of each branch is occupied by such a region of formative tissue. Even cells which have passed into a later stage of growth may return under certain conditions to the formative stage. This occurs normally in those stems which increase in thickness and form one or more growing zones concentric with the surface. A division of the cells in these zones is mainly in a plane parallel to the surface; the additions increase the diameter of the axes. When a plant is wounded, cells adjacent to those injured may regain their power of division and produce a callus, which closes and heals the wound.

FIG. 4. Longitudinal section of growing point of root of corn (monocotyl). Apex (where cell-rows converge) occupied by a group of cells, instead of one, as in selaginella (Fig. 2). The root-cap is well developed.

ENLARGEMENT. In the second phase of growth, enlargement, division of the cells has practically ceased, and the greater part of the increase in size is due to the rapid absorption of water, which is secreted by the protoplasm in the form of drops in its substance. As these increase in number and volume, they often unite, and usually by the time increase in size has been completed all have united to form one large sap-cavity (vacuole), in which the protoplasm constitutes a layer pressed firmly against the cell-wall (Fig. 5). Since this mode of growth involves

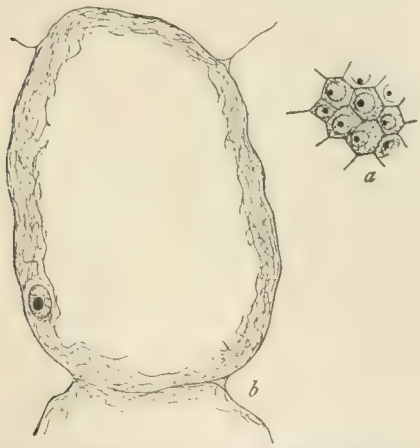


FIG. 5. *a*, Several young cells from the cortex of a root of the bean; *b*, one from the same region after attaining its full size. Drawn to same scale. The volume of *b* is more than 1700 times that of *a*, though, as the wrinkling shows, it is not turgid.

a relative unimportant increase in the amount of living protoplasm, it is extremely economical. In this feature the growth of plants differs most strikingly (in degree at least) from that of animals. During this second phase of growth the volume of the cells may increase a thousand to fifteen hundred fold. Characteristics of the cells in this phase are, therefore, (a) rapid increase in volume, and (b) high percentage of water. The rate of enlargement during this phase is not uniform; nor does it persist indefinitely, even though the conditions may be constantly favorable. The increase in volume, at first relatively slow, becomes more and more rapid until it attains a maximum rate, from which point it rapidly declines, and soon ceases altogether. The total period of enlargement is spoken of as the grand period of growth (Fig. 6).

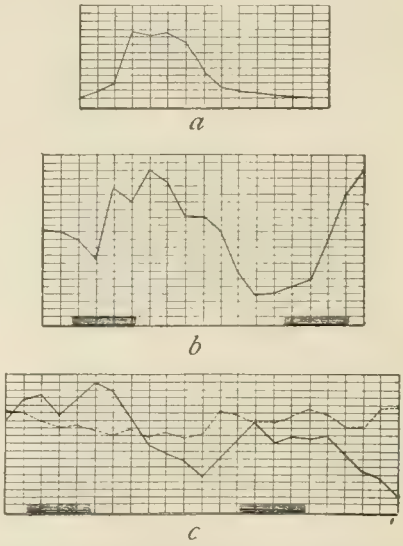


FIG. 6. DIAGRAM SHOWING PERIODIC VARIATIONS IN GROWTH.

The horizontal lines show equal increments of growth; the vertical lines equal intervals of time. *a*, grand period of growth in root of bean (Vicia); *b*, daily period of growth in stem of barley; *c*, daily period of stem of mustard (solid line) and of leaf of onion (broken line). In *b* and *c* the shaded bars represent hours of darkness.

It lasts in different plants from five to fifteen days, depending on various factors which influence both duration and rate. Since the formative regions are located at the tips of the axes, the regions of enlargement may be found a short distance from the tip. In roots the elongating region is very short, comprising usually less than 10 millimeters (0.4 inch). In stems, however, the elongating region is usually from 10 to 20 centimeters in length (4 to 8 inches), and in climbers may even reach 50 to 80 centimeters (20 to 30 inches).

The rate of enlargement (especially of elongation) is likely to be different on different sides of a bifacial or radial organ. In that case these organs will be correspondingly curved. The region elongating most rapidly will become convex and the opposite side concave. This curvature, which is determined by unknown, possibly internal, causes, is called nutation (q.v.). The curvatures of bifacial organs, which are also dorsiventral, are further distinguished by the terms 'epinasty' and 'hyponasty.' An epinastic curvature is the effect of greater growth upon the dorsal side; a hyponastic curvature upon

the ventral side. Similar variations in growth are induced by the action of external agents; thus, epinasty produced by the action of the light is designated photo-epinasty, etc. Nutation is exhibited by young leaves of ferns, which are rolled upon themselves in a coil and straighten as they grow older; by the leaves of buds and flowers, whose closed form (bud) is due to the more rapid growth of the outer faces and their 'opening' to the more rapid growth of the inner faces. The rate of enlargement is affected in various ways by external stimuli (see IRRITABILITY), which will be considered later. Examples of very rapid growth are furnished by the filaments of the stamens of wheat, which elongate, as the flower opens, at the rate of 1.8 millimeters (0.07 inch) per minute (about the speed of the minute-hand of a man's watch); by the leaf-sheath of the banana, which grows at the rate of 1.1 millimeters (.04 inch) per minute; by the flower-axis of the century-plant, which grows at the rate of 15 centimeters (6 inches) in twenty-four hours; and by the leaves of *Victoria regia*, which increase in diameter at the rate of 30 centimeters (12 inches) in twenty-four hours. The rate of growth is studied by means of the auxanometer (q.v.).

INTERNAL DEVELOPMENT. The third phase of growth is the phase of internal development. No increase in size occurs during this phase. It is marked by increase in thickness of the cell-walls (unequal in different parts), by the death of some cells, and by other less noticeable changes. Since the growth of different groups of cells (tissues) is rarely equal, it follows that the tissues—some compressed, some stretched—firmly united as they are, finally exert strains upon one another in various directions, which serve an important purpose in maintaining the rigidity of the plant.

FACTORS ON WHICH GROWTH IS DEPENDENT. The conditions of growth are four: First, an adequate supply of constructive materials, which are necessary for the formation of a new organic substance, protoplasm, cell-wall, etc.; second, an adequate supply of water, which is necessary for the enlargement of the cells; third, access of free oxygen, which is necessary for respiration, by which the requisite energy is set free; fourth, a temperature within definite limits, which, however, vary with different plants, the minimum being approximately 0° C. (32° F.), and the maximum 40° C. (104° F.). The best average temperature for the growth of most of the higher plants lies between 25° and 32° C. (77° and 89.6° F.).

The effects of external agents upon growth are numerous and profound. Scarcely any change in external conditions can occur without modifying the growth of the plant. These effects may be unequal in different tissues, or in different parts of an organ, or they may be uniform, so that the total growth of the part is retarded or accelerated. The most noticeable effects, naturally, are those which produce curvature and consequent displacement of certain parts. See under CHEMOTROPISM; ELECTROTROPISM; GEOTROPISM IN PLANTS; HELIOTROPISM; HYDROTROPISM; RHEOTROPISM; THERMOTROPISM; and THIGMOTROPISM. The most important effects upon the general rate of growth are those produced by temperature and light. In general, growth is accelerated by increased temperature up to the optimum point, but further increase beyond the optimum retards it. On the other hand, growth seems to be definitely retarded by light. Since under ordinary conditions plants are subject to daily variations in temperature and light, there arises a corresponding daily variation or 'daily period' in the rate of growth (Fig. 6). Since the temperature rises during the day and diminishes during the night, the general effect will be to accelerate growth during the day and retard it during the night. As light, however, retards growth during the day, the final effect will be a resultant between these two opposing factors, the effect of light as a rule predominating. The minimum usually occurs in the afternoon and the maximum after midnight, and this variation persists for many days, if plants be kept in continuous darkness.

CORRELATION. The growth of one part of the plant is directly affected by the activity of another. Thus the failure of a certain organ to develop may determine the development of another to an unusual extent or in an unusual form. This mutual influence of plant organs, both as to their formation and the course of their development, is termed correlation. Examples of correlation may be found in the development of the stipules of the pea and the pansy to an extraordinary size when the leaf-blades are removed early; in the continued blossoming of plants when fruit is not permitted to form; in the symmetrical or grotesque shaping of a plant made possible by pruning; in the transformation of an underground branch of the potato, which would normally form a potato at its tip, into an aërial shoot bearing leaves and flowers when the aërial parts are cut away.

GRUB (connected with OHG. *grubilōn*, Ger. *grübbeln*, to dig, and Goth., OHG. *graban*, Ger. *graben*, AS. *grafan*, Eng. *grave*). The name commonly given to the larva of a coleopterous insect. Thus the larvæ of the May beetles of the genus Lachnosterna, found commonly in the soil, are known as 'white grubs.' The larvæ of certain flies (Diptera) are also called grubs, although the term 'maggot' is now specifically applied to them. Thus 'grubby cattle' means, in the West, cattle affected by the 'ox-bot' or 'ox-warble,' the larva of the dipterous insect *Hypoderma lineata*. The 'grub' of sheep is also the larva of a fly (*Œstrus ovis*). See BEETLE; BOT; WARBLE-FLY.

GRUBB, Sir HOWARD (1844—). An Irish astronomer and instrument-maker. He was born in Dublin, Ireland, July 28, 1844, being the son of Thomas Grubb (q.v.), the famous optician, whose business he succeeded to in 1868. He was educated at Trinity College, Dublin. Under his direction the optical establishment founded by his father achieved increased reputation, and constructed a large number of telescopes, including those for the University of Oxford and the observatory at Potsdam. Sir Howard Grubb was knighted in 1887. He was vice-president of the Royal Society of Dublin, honorary secretary of the Royal Dublin Society, president of the Photographic Society of Ireland, and a member of the Board of Irish Lights Commissioners.

GRUBB, THOMAS (1800-78). A distinguished Irish optician. He was born at Kilkenny, Ireland, and in the course of his life constructed the equipment of some of the most important astro-

nomical observatories. At an early age he gave up business for engineering, and soon gained a high reputation as a maker of fine machinery and instruments, many of which were of his own invention. He also exhibited great skill as an optician, particularly in the construction and mounting of reflecting telescopes. He constructed the metallic speculum for the Melbourne Observatory reflector, which had a diameter of four feet, and was used in making photographs of the moon. Grubb was elected a fellow of the Royal Society in 1864, the Royal Astronomical Society in 1870, and was for many years a member of the Royal Irish Society. To the journals of these societies he contributed papers on astronomical instruments and optics.

GRUBBER. See CULTIVATOR.

GRÜBEL, grṳ'bel, JOHANN KONRAD (1736-1809). A German folk-poet, born at Nuremberg. He became known by his poems in the Nuremberg dialect, which first appeared under the title *Gedichte in Nürnberger Mundart* (3 vols., 1802). These poems reflect the life of the old German city, and entitle Grübel to be ranked with such eminent dialect poets as Hebel, Groth, and others. Another volume entitled *Korrespondenzen und Briefe in Nürnberger Mundart* appeared in 1808.

GRUBER, groo'bẽr, JOHANN GOTTFRIED (1774-1851). A German scholar, born at Naumburg. He studied at Leipzig, was employed for some time in editorial work, and held professorships of philosophy at Wittenberg and Halle successively. He was the author of a large number of works on historical and critical subjects. With Ersch, after the death of Hufeland, he edited the great *Allgemeine Encyklopädie der Wissenschaften und Künste.* Among his independent publications are: *Geschichte des menschlichen Geschlechts aus dem Gesichtspunkte der Humanität* (1806); *Wörterbuch der Aesthetik, der schönen Kunste,* etc. (1810); and *Wörterbuch der altklassischen Mythologie* (1810-15). He also edited Wieland's *Sämtliche Werke* (53 vols., 1818-28), to which he added a biography.

GRUB STREET. A London street, described by Dr. Johnson as "originally the name of a street near Moorfields, much inhabited by writers of small histories, dictionaries, and temporary poems, whence any mean production is called *Grub Street.*" Employed in a disparaging sense by Andrew Marvell, it was frequently used by Pope, Swift, and other wits. The *Grub Street Journal,* which ended in 1737, was one of the most entertaining of the old newspapers, and contained contributions from the partisans of Pope attacking the Dunces. The locality is now termed Milton Street.

GRU'GRU (native name). The grub or larva of *Rhyncophorus palmarum* (called in the older works *Calandra palmarum*), an insect of the weevil family (*Curculionidæ*), inhabiting Guiana, Cuba, Porto Rico, and other tropical parts of America. The perfect insect is an inch and a half long. The grub is an ugly, inactive creature of a whitish cream-color, as long and as thick as a man's thumb, and lives in the soft and spongy central part of the cabbage-palm (*Euterpe oleracea*), on which it feeds. It is extremely fat and oily, and is esteemed a great delicacy, not only by the Indians, but by many of the European colonists and their descendants, particularly the Dutch. It is cooked by roasting, and eaten with bread and butter, after being sprinkled with cayenne pepper. The fragrance of roasted grugru is said to be most tempting to epicures. A cabbage-palm which has been cut down often becomes in a short time almost filled with grugrus; but they are usually obtained from the upper part of the stem of growing palms, near the crown.

GRUIĆ, groo'ich, SAVA (1840—). A Servian statesman, born at Kolare. He was chief of the artillery division, under General Tchernayeff, in the Servian Army during the war with Turkey in 1876. Upon the outbreak of the Russo-Turkish War of 1877, he was appointed Minister of War, and afterwards was sent to Bulgaria as the first diplomatic representative of Servia to that country. In 1877 he returned to Belgrade, and thereafter was twice Minister of War and three times president of the Ministry. In 1900 he was made Servian Ambassador at Constantinople.

GRUMBKOW, groom'kô, FRIEDRICH WILHELM VON (1678-1739). A Prussian soldier and statesman, born in Berlin. He served in the wars against France and enjoyed the favor of Frederick William I., who employed him in both military and administrative matters. As the head of the War Department of Prussia he increased and improved the army, and in a civil capacity he introduced important tax reforms and considerably improved the administration of the municipalities. In his foreign policy he was not so fortunate, and his pro-Austrian leanings involved Prussia in numerous difficulties abroad.

GRUMBLER, THE. A comedy by Sir Charles Sedley, printed in 1702, but apparently not produced until 1754, and adapted by Goldsmith in 1773 for Quick's benefit. It is an English version of Brueys's *Le Grondeur.*

GRUM'BLETO'NIANS. A term applied in seventeenth-century English politics to the Country Party, which was also known as the Petitioners, and which constantly protested against the policy of the later Stuarts.

GRÜN, grṳn, ANASTASIUS. See AUERSPERG, A. A.

GRÜNBERG, grṳn'bĕrk. Capital of the circle of the same name in the Prussian Province of Silesia, situated on a tributary of the Oder, 32 miles northwest of Glogau (Map: Prussia, F 3). It lies amid vine-clad hills, and is noted chiefly for the sparkling wine which has been produced in its vicinity for centuries. Besides wine, there are produced cloth, yarn, paper, brandy, machinery, flour, etc. Population, in 1890, 16,092; in 1900, 20,983.

GRUND, groont, FRANCIS JOSEPH (1805-63). An American author, born in Bohemia. He came to the United States in 1826, and in 1854 was sent abroad to represent the United States in consular and diplomatic positions. He contributed frequently to the press, and wrote a number of books, essays, and addresses, among them: *Americans in Their Moral, Religious, and Social Relations* (1837); *Aristocracy in America* (1839); *Thoughts and Reflections on the Present Position of Europe and Its Probable Consequences to the United States* (1860); and a campaign *Life of Gen. William Henry Harrison* (1840), written in German.

GRUND, Franz Friedrich Alexander (1814-92). A German engineer. He was born at Heinrichau, Silesia, and was educated at Breslau and Berlin. In 1854 he was appointed inspector of hydraulic engineering in the Rhine Province, and in 1862 he became advisory counselor in the Prussian Ministry. Among the hydraulic engineering works executed by him are those on the river Wupper and in Alsace-Lorraine. He also planned the Rhine-Meuse Canal, the harbors at Emmerich and Oberlahnstein (at the junction of the Lahn and Rhine rivers), and the extension of the harbor at Ruhrort, at the junction of the Ruhr and the Rhine. His memorial on the waterways of Alsace-Lorraine became the basis upon which the boundaries, as affecting rivers, canals, and so on, were subsequently determined in the annexed provinces.

GRUNDEMANN, groōn'de-mán, Reinhold (1836—). A German Protestant theologian, born in Bärwald, in the Neumark, Brandenburg. He studied at Tübingen, Halle, and Berlin, after which he occupied himself with pastoral duties from 1861 until 1865, when he devoted himself to the study of missions in England, Holland, and North America, concerning himself especially with their geographical aspects. As the result of his labors, he published *Allgemeiner Missionsatlas* (1867-71, 1872, with maps), an amplification of his previous *Missionsweltkarte* (3d ed. 1886). In 1869 he was made pastor in Mörz, near Belzig. His works include: *Biographie des Missionärs J. F. Riedel* (1873); *Die Entwickelung der evangelischen Mission* (1878-88); and *Missions-Studien und Kritiken in Verbindung mit einer Reise nach Indien* (1894).

GRUNDTVIG, groōnt'vig, Nikolai Frederik Severin (1783-1872). A Danish historian and poet. He was born at Udby, Zealand, was educated at Copenhagen, was appointed pastor of Praestö, Zealand, in 1821, and in 1822 became chaplain of the Church of the Saviour at Copenhagen. He first attacked the ruling rationalism in his *Kirkens Gjenmæle* (1825), a work which aroused bitter controversy, and caused him to be deprived of ecclesiastical office from 1826 to 1839. In 1861 he was appointed bishop. He was a champion of religious and civic freedom, and advocated the severance of Church and State. His views led to the formation of a school which sought to secure many important reforms. In addition to his popular ballads, he wrote the *Kort Begreb af Verdens Krönike i Sammenhæng* (1812); translations of Saxo Grammaticus and Snorre Sturleson (1818-22); and many polemical essays. He became a leader of the Danish party in the Diet, and vigorously opposed German influence. After 1866 he became more conciliatory toward Prussia. He is best known by his books on *Northern Mythology* and some volumes of poetry.

GRUNDTVIG, Svend Hersleb (1824-83). A Danish philologist, born in Copenhagen, September 9, 1824, son of the preceding. His early education was conducted wholly by his father, who disapproved of the prevailing methods in Denmark at that time. The study of Greek, Danish, Old Norse, and English preceded that of Latin, and the father's enthusiasm for Danish ballads turned the son's attention at a very early age in that direction. Grundtvig's name is now especially associated with the ballad literature of his native land. His first important publication was a critical edition of English and Scotch ballads (1842-46). In 1853 the first volume of his *Danmarks gamle Folkeviser* appeared, the fourth and last volume being published soon after his death in 1883. In 1882 he published a selection of these ballads in one volume. Grundtvig's position among Danish philologists is of the highest, in the same class with Rask and Madvig. In 1863 he was appointed docent in Old Norse literature at the University of Copenhagen, and full professor in 1868. He died July 14, 1883.

GRUN'DY, Felix (1777-1840). An American lawyer and politician, born in Berkeley County, Va. In 1779 his father removed with his family to western Pennsylvania, and in the following year to Kentucky, where Felix, one of seven brothers, was brought up amid the perils and privations of a frontier life. He was educated at Dr. Priestly's academy at Bardstown, and studied law. In 1799 he became a member of the Kentucky Legislature, where he met Henry Clay in debate, but resigned in 1806 to accept an appointment as judge in the Supreme Court of Errors and Appeals. The next year he became Chief Justice, but, owing to the insufficiency of the salary, resigned from the bench in 1808 and settled in Nashville, Tenn., where he achieved a wide reputation as a criminal lawyer. In 1811 and 1813 he was elected, as a Democrat, to Congress, and in 1819 was a member of the Tennessee Legislature, where he successfully advocated the establishment of a State bank. In 1829 he was elected to the United States Senate, to fill the unexpired term of James H. Eaton, who had entered Jackson's Cabinet as Secretary of War, and in 1832 was reëlected for a full term. In the Senate he was chairman of the Judiciary Committee, and was a strong advocate of most of Jackson's measures, although he maintained a somewhat neutral position in the Nullification controversy. He was a consistent opponent of Clay's 'American policy' and of the United States Bank. In September, 1838, he entered Van Buren's Cabinet as Attorney-General, but held office only until December, 1839, when he resigned to enter the Senate again, serving therein until his death, which followed an electioneering tour in behalf of Van Buren's reëlection in the fall of 1840.

GRUNDY, Mrs. A very censorious person, to whom Dame Ashfield, in Morton's play of *Speed the Plough*, often refers in the expression, "What will Mrs. Grundy say?" but who does not appear among the *dramatis personæ*. Hence the name has come to denote that part of society whose opinions are considered with reference to any proposed act or course of conduct.

GRUNDY, Sydney (1848—). An English dramatist, born in Manchester. He was educated at Owens College, and was called to the bar in 1869, but after 1872 devoted himself to the writing of plays and comic operas, ephemeral in character but of temporary popularity, such as: *A Little Change* (1872); *In Honor Bound* (1880); *The Glass of Fashion* (1883); *A Pair of Spectacles* (1890); *Sowing the Wind* (1893); *A Bunch of Violets* (1894); *The Silver Key* (1897); *The Degenerates* (1899); and *Frocks and Frills* (1902).

GRUNER, grōō'nĕr, JUSTUS VON (1777-1820). A Prussian statesman. He was born at Osnabrück, and was educated at Halle and Göttingen. In 1809 he was appointed president of the police department of Berlin, where he introduced so admirable an organization that two years later he was advanced to the command of the entire police force of Prussia. In this position he displayed great shrewdness in circumventing the French method of espionage at work throughout the kingdom. After the conclusion of the Prussian alliance with France, Gruner, who was an implacable enemy of Napoleon, tendered his resignation, and subsequently was intrusted in Prague with the organization of the national defense in Germany, planned by Baron von Stein. He was arrested in 1812, by order of the Austrian Cabinet, which had determined on the measure in order to rescue him from capture at the hands of the secret police of France, who had traced his movements. In 1814 he was made Governor-General of Berg, and in the following year was appointed chief of the German police in Paris during the occupation of that city by the Allies. During the last four years of his life he was Prussian Ambassador to Switzerland. As Governor-General of Berg and of the Middle Rhine he organized the patriotic rising against Napoleon, issuing proclamations, and traveling from place to place in order to arouse the people. It was he also who succeeded, while chief of the German police in Paris, in obtaining the restoration of the art treasures seized by the French during their occupation of German territory.

GRUNER, WILHELM HEINRICH LUDWIG (1801-82). A German line-engraver, born in Dresden. He was a pupil of Klingen and Krüger, in Dresden, and he also studied under Longhi and Anderloni in Milan. From 1837 till 1841 he resided in Rome, where he engraved the "Mosaics of the Chigi Chapel," published in 1839. In 1842 he went to England, where he remained until he was called to be director of the Cabinet of Engraving in Dresden, in 1856. While in England he engraved "Decorations of the Garden Pavilion of Buckingham Palace" (1846), and "Specimens of Ornamental Art" (1850), ordered by the British Government. At the King's desire he also produced for the Berlin Museum a number of Raphael's cartoons from the originals at Hampton Court. His sight being for a time affected, he devoted himself to fresco painting, and he had a share in the decoration of the Crystal Palace in London, and in the decorations of Osborne Castle and Buckingham Palace. Gruner remained in Dresden until his death. While there he published a series on the *Cathedral of Orvieto* (Leipzig, 1858); *Luini's Decorations of Santa Maria delle Grazie, Milan* (London, 1859-60); and his *Terra-Cotta Architecture of Northern Italy* (1867). He also engraved a number of special plates, especially after Raphael and Overbeck.

GRUNERT, grōō'nĕrt, JULIUS THEODOR (1809-89). A German forester, born and educated at Halle. He was appointed assessor of forests for the Prussian Government at Königsberg in 1839, and thereafter held important positions under the Government at Danzig and other cities of Prussia, and was also for a time director of the Academy of Forestry at Eberswalde. His last appointment was at Treves, where he was chief forester from 1866 until his retirement in 1878. He was founder and editor of the *Forstliche Blätter* (established 1861), and wrote the works entitled: *Der preussische Forster* (2d ed. 1883); *Forstlehre* (4th ed. 1884); and *Die Jagdgesetzgebung Preussens* (1885).

GRÜNEWALD, grụ'ne-vält, MATTHIAS (?-c.1529). A German painter, born at Aschaffenburg. He spent most of his life at Mainz, but very little is known of his personal history. The treatment of his figures is broader and more expressive, and at the same time softer and of richer color, than anything that had hitherto been attempted; and he ranks among the first of German painters. His works were for a long time confounded with those of Cranach. The most important of them is an altarpiece from Isenheim (now in the Colmar Museum); it represents the Madonna and Child with angel musicians (centre picture), the Resurrection and Annunciation, and scenes from the life of Saint Anthony. Other works are: the wings of an altarpiece—Saint Lawrence and Saint Cyriacus—in the Frankfort Museum; "The Conversion of Saint Maurice," in the old Pinakothek, Munich; and an altarpiece owned by Queen Victoria is also attributed to him.

GRÜNHAGEN, grụn'hä-gĕn, KOLMAR (1828—). A German historian, born near Breslau, and educated at Jena, Berlin, and Breslau, where in 1855 he was made docent in history, and eleven years later professor. He edited the *Zeitschrift des Vereins für Geschichte und Altertum Schlesiens* (1862 et seq.), and was long head of the governmental archives in Breslau. He wrote much on the history of Silesia: *Breslau unter den Piasten als deutsches Gemeinwesen* (1861); *Friedrich der Grosse und die Breslauer, 1740-41* (1864); *Die Hussiten-Kämpfe der Schlesier* (1872); *Geschichte Schlesiens* (1884-86); and *Schlesien unter Friedrich dem Grossen* (1890-92). Grünhagen published many valuable documents, especially from the Middle Ages, bearing on the history of the province.

GRÜNINGER, grụ'nĭng-ẽr, JOHANN, also known as JOHANN REINHART VON GRÜNINGEN (c.1450-?). A German printer. He became a master in Basel in 1480, and in 1482 was made a burgher of Strassburg, where between 1483 and 1529 he printed about 250 works, many of them illustrated with wood engravings, but full of errors. At the beginning of the Reformation in Strassburg he published a number of Catholic polemic treatises.

GRUNT. A name commonly used by fishermen for various species of the drum (q.v.), especially the fresh-water species (*Haplodinotus grunniens*). It refers, like 'croaker' and other names, to the vibratory 'grunting' sounds made by these fishes.

GRUPPE, grōōp'pe, OTTO FRIEDRICH (1804-76). A German scholar and author, born at Danzig, and educated at Berlin. His opposition to the then prevailing Hegelian philosophy was so strong that he was not allowed to qualify as a docent. He became a journalist, wrote for the *Preussische Staatszeitung*, and became its editor in 1835. Seven years later he was appointed to a position in the Ministry of Education, and in 1844 he became professor of the philosophic faculty in Berlin. His philosophic

work is contained in *Antäus* (1831), *Wendepunkt der Philosophie im 19. Jahrhundert* (1834), and *Gegenwart und Zukunft der Philosophie in Deutschland* (1855), all anti-Hegelian. He was a classical scholar of much ability, and wrote: *Die kosmischen Systeme der Griechen* (1851); *Ariadne*, on Greek tragedy (1834); the valuable work *Die römische Elegie* (1838); and *Minos* (1859) and *Aeacus* (1872), in which he discussed interpolation in the Roman poets of the Augustan Age. His other works include: the epic poems *Königin Bertha* (1848), *Theudelinde* (1849), *Kaiser Karl* (1852), *Firdusi* (1856), *Ruth, Tobias, Salamith* (2d ed. 1859), and *Vaterländische Gedichte* (1866-67); the drama *Otto von Wittelsbach* (1861) and a continuation of Schiller's *Demetrius* (1861); the anthologies *Der deutsche Dichterwald* (1849), *Sagen und Geschichten des deutschen Volks aus dem Mund seiner Dichter* (1854); and the critical work *Leben und Werke deutscher Dichter* (2d ed. 1872).

GRUPPETTO, grōō-pĕt'tô (It., little group, diminutive of *gruppo*, group). In music, a term signifying that kind of embellishment called the *turn*. (See GRACE NOTES.) It may also be applied to a group of grace notes in general.

GRUSCHA, grōō'shȧ, ANTON JOSEPH (1820—). A Roman Catholic prelate. He was born in Vienna, and in 1843 was made a priest. In 1851 he was appointed professor of religion in the Theresianum, and in 1855 preacher in the Cathedral of Saint Stephen in Vienna. After that his rise was rapid, and he was appointed in succession to the offices of Privy Chamberlain of the Pope (1858); professor in the University of Vienna (1863); Canon of Saint Stephen's (1871); Apostolic Field Vicar of the Army, and Bishop of Karrhä in partibus (1878); Archbishop of Vienna (1890); and cardinal (1891). He has contributed frequently to Catholic periodicals, and published a *Handbuch der katholischen Religionslehre für höhere Lehranstalten* (1851).

GRU'SIA. See GEORGIA.

GRUSIN'IAN. A name used by some ethnologists to designate the Georgian peoples of the Caucasus. It is derived from *Grusia*, the Russian name of Georgia.

GRUSON, grōō'zŏn, HERMANN (1821-95). A German inventor and iron-master, born at Magdeburg, and educated at Berlin. After working in the Borsig locomotive works he was mechanic on the Berlin-Hamburg road (1845); then was chief engineer of the Wöhlert machine shop in Berlin, and in 1855, after serving as manager of a steamship company at Buckau, set up a shipyard of his own and an iron foundry. The result of his experiments here was the invention of a process for chilled cast iron (see ARMOR PLATE), which found many uses in industrial machinery, as well as for armor and shells. The metal, sometimes called 'Gruson metal,' is used also in the manufacture of the Gruson rapid-fire gun and the Gruson anchor. In 1886 his establishment was incorporated with Gruson as manager. He retired in 1891, and in 1893 the works were bought by the firm of Krupp (q.v.). Gruson wrote studies in physics under the title, *Im Reiche des Lichts* (2d ed. 1895).

GRUTER, grụ'tẽr, or **GRUYTÈRE,** grụ-ê-târ', JAN (1560-1627). A Belgian classical scholar, born at Antwerp. After studying at the universities of Cambridge and Leyden, he held various professorships until 1592, when he was made professor of history at the University of Heidelberg. In 1602 he became librarian of Heidelberg, but during the siege by Tilly in 1622 the valuable Palatine collection of books, of which he was keeper, was sent to Rome, together with his own private library. He published editions of many of the Latin classics, but is remembered chiefly for his *Lampas sive Fax Artium Liberalium* (1602-34), a collection of the best critical and antiquarian treatises of the sixteenth century, and his masterpiece, *Inscriptiones Antiquæ Totius Orbis Romanorum* (1603; edited by Gudius, Grävius, and Burmann, 4 vols., 1707), to which Joseph Scaliger (1540-1609) wrote a valuable index. Consult Hulst, *Jean Gruytère* (Liège, 1847).

GRÜTLI, grụt'lê, or **RÜTLI.** A meadow in the Canton of Uri, Switzerland, occupying the western shore of the Lake of Uri, the southern portion of the Lake of Lucerne (Map: Switzerland, C 2). It is regarded as the cradle of Swiss liberty, tradition designating it as the place where in November, 1307, Arnold of Melchthal, Fürst, and Stauffacher planned the revolt against Austria which resulted in the independence of Switzerland. The tract was purchased in 1859 by the school-children of Switzerland to be preserved as national property. A monument commemorating the event was erected there in 1884.

GRÜTZNER, grụts'nẽr, EDUARD (1846—). A German painter, born at Gross-Karlowitz. He was a pupil at the Munich Academy, and afterwards of Piloty. He is principally known through his pictures of scenes from Shakespeare, and his humorous genre subjects from monastic life. The latter include: "In the Convent Cellar;" "Testing Wine;" "Convent Brewery;" "Capuchin Mending His Cowl;" and "Monastic Hospitality." His Shakespeare studies include: "Falstaff at the Inn" (1869); "Falstaff and His Companions in the Wood" (1870); "Scene from *As You Like It*;" and "Scene from *The Merry Wives*."

GRUYÈRES, grụ'yâr'. A town of Switzerland, situated 16 miles southwest of Fribourg (Map: Switzerland, B 2). It has an old castle of the former counts of Gruyères, and is a centre for the celebrated Gruyère or Swiss cheese. Population, in 1900, 1375.

GRUYTÈRE, grụ-ê-târ', JAN. See GRUTER.

GRYL'LIDÆ (Neo-Lat. nom. pl., from Lat. *gryllus, grillus*, cricket). A family of insects of the order Orthoptera, including those forms known as crickets. It comprises three distinct groups, the true crickets, typified by the common field-cricket, the tree-crickets, and the mole-crickets. See CRICKET.

GRYPHÆ'A (Neo-Lat., from Lat. *gryphus, gryps*, Gk. γρύψ, griffin, from γρυπός, *grypos*, hook-nosed). A pelecypod genus of the family Ostreidæ, found fossil in, and very characteristic of, Mesozoic rocks. The shell has little resemblance in form to the majority of pelecypods, for it is very unsymmetrical, the left valve being much enlarged and strongly arcuate with under-turned beak, while the right valve is small, flat, and lid-like. The best-known species are Gryphæa arcuata of the European Lias, and Gryphæa vesicularis of the Cretaceous of both North Amer-

ica and Europe. At some Cretaceous localities in the United States Gryphæa shells have been washed out of the soft deposits in which they were entombed, and now lie scattered on the surface of the ground in great numbers. See EXOGYRA.

GRYPHIUS, grĭf'ĭ-ŭs, *Ger. pron.* grē'fē-ŭs, ANDREAS (1616-64). A German dramatic poet, whose real name was Greif. He was born at Grossglogau. He studied at Leyden, traveled in France and Italy, and was appointed Syndic of Glogau. The struggles of his youth and the envy of later years, as well as physical weakness, made his lyrics sombre and his epigrams sharp. But his dramatic work, which is far more important, suffers little from his own experience of the tragedy of life; and the plays *Leo Armeenius* (1646), *Katharina von Georgien* (1647), *Cardenio und Celinde,* and *Papinianus,* though marred by imitations of Seneca and of Vondel, show considerable power. His comedies are even better. *Peter Squentz,* or *Absurda Comica* (c.1650), is based on the main episodes of the *Midsummer Night's Dream; Horribilicribrifax,* of about the same date, has much the same motive as Plautus's *Miles Gloriosus,* save that it adds a pedantic scholar, besides a braggart captain; and *Das verlibte Gespenste* (1660), and *Die gelibte Dornrose,* written in the dialect of Silesia, are full of humor. Several of his plays and lyrics have been reprinted in recent times. Gryphius also translated many Dutch, Italian, and French plays; wrote an epic in Latin, and was considered a marvel of learning, as he knew eleven languages and lectured on logic, anatomy, geography, history, mathematics, astronomy, and Roman antiquities. A fairly complete edition of his works is that published at Breslau (1657-63). Consult: Hermann, *Ueber Andreas Gryphius* (Leipzig, 1851); Klopp, *Andreas Gryphius als Dramatiker* (Osnabrück, 1852); and Wysocki, *Andreas Gryphius et la tragédie allemande au XVIIème siècle* (Paris, 1893).

GRYPHIUS (properly GREYFF), SEBASTIAN (1493-1556). A German printer, born at Reutlingen, and a brother of Franz Greyff, who published at Paris a *Lexicon Græco-Latinum.* Sebastian went to Lyons before 1524, and printed there more than three hundred titles in Hebrew, Greek, and Latin, but very few in French. The best-known among his books are a Latin Bible of 1550, in unusually large type, and a *Thesaurus Linguæ Sanctæ,* by Sanctus Pagninus (1529). His son ANTOINE carried on his father's business for a time in Lyons.

GRYPHON, grĭf'ŏn (archaic form of *griffin*). (1) A fabled monster with the head of an eagle and the lower part of a lion. (2) In *Orlando Furioso,* the brother of Aquilant, a brave champion and a follower of Charlemagne.

GRYSBOK, grĭs'bŏk (Dutch *grijsbok,* from *grijs,* gray + *bok,* buck). A small chocolate-red antelope (*Nanotragus melanotis*), one of the steinboks (q.v.), now met with only in the hilly country north and west of the Limpopo River. Compare ORIBI.

GUACA, gwä'kâ, or **HUACA,** hwä'kâ. See PERUVIAN ANTIQUITIES.

GUACAMAIA, gwä'kâ-mī'â. A West Indian parrot-fish (q.v.).

GUACHARO, gwâ-chä'rô, OIL-BIRD, or FAT-BIRD. A curious bird of northern South America, which has many resemblances to the nightjars, but is now regarded as constituting a separate family, the Steatornithidæ. Its specific name is *Steatornis Caripensis,* in allusion to the valley of Caripe (q.v.), where it was first obtained by Humboldt and Bonpland. It is about the size of a crow, much resembles a nightjar in form and plumage, and is wholly nocturnal, spending the day in vast numbers in deep and dark caverns. At night the birds come forth, chattering with a queer clicking note, and search the forests for food, which consists of oily nuts and fruits. The hard, indigestible seeds swallowed by the guacharos accumulate on the floor of their caves in great quantities, and many of them sprout and grow in pale, colorless forms of plants, which form a most singular part of the scenery of the caverns. The bird is said to make a bowl-like nest of clay, in which are laid two to four white eggs. The young are extremely fat, and are gathered by the Indians and used by many white persons as food; but more extensively as the source of a clear and very useful oil, which is tried out of their bodies. The guacharo inhabits Trinidad and neighboring islands, and various inland parts of Venezuela and Ecuador. Consult Newton, *Dictionary of Birds* (London and New York, 1893-96), where many further references will be found. See Plate of NIGHTJARS, ETC.

GUACHOS, gwä'chōz. See GAUCHOS.

GUACO, gwä'kô (South American name). A Peruvian medicinal plant. See EUPATORIUM.

GUADALAJARA, gwä'dâ-lâ-hä'râ (Lat. *Arriaca*). Capital of the Spanish province of the same name, situated on the left bank of the Henares, 35½ miles by rail northeast of Madrid (Map: Spain, D 2). It is an ill-built town, but has many buildings of interest, some of which, however, have fallen into ruin. The chief of these are the palace of the Mendozas, the feudal lords of Guadalajara; the *Panteón,* in which they are buried; the Cloister of San Francisco, now a fort; and the Gothic-Arabian palace of the dukes of the Infantado. There are also some notable churches, and several educational establishments, including a school of military engineering, and the provincial institute, museum, and library, installed in an old convent. The industrial establishments include textile and flour mills. Guadalajara fell into the hands of the Moors in 714, but became a possession of Castile in 1081. Population, in 1897, 11,513; in 1900, 10,944.

GUADALAJARA. The capital of the State of Jalisco, Mexico, situated near the Rio Grande de Santiago, 3600 feet above sea-level (Map: Mexico, G 7). The surrounding district is fertile and rich in silver-mines, and the city itself is well built, with straight, well-paved streets, and many large squares, being the third city in the country in size, and second only to Mexico in importance. The chief buildings are the cathedral, dating from 1618, which has a magnificent interior, and contains a beautiful painting by Murillo; the university, the Government building, episcopal palace, theological seminary, high school, and art academy. The city has also a public library of 24,000 volumes; a botanical garden, and a number of scientific and literary institutions, as well as several fine

theatres. The numerous convents rent their arcades to shopkeepers. The water-supply is derived from the many springs near the city, and is brought by an aqueduct eight miles long. Guadalajara is the centre of the iron, steel, and glass industries in Mexico, and also manufactures pottery and leather. It is the residence of a United States consular agent, and imports large quantities of manufactured goods from the United States. Population, 95,000. Guadalajara was founded in 1530.

GUADALAVIAR, gwä'dȧ-lä'vê-är' (Ar. *wād al-abyaḍ*, white river). A river of Eastern Spain, rising in the Sierra de Gúdar, in the Province of Teruel, and flowing in a south and southeast direction through Valencia. It falls into the Mediterranean at the town of Valencia. Length, about 150 miles. In one place the river passes through a defile or cañon, only 50 feet wide, with perpendicular rocky sides 450 feet high, and the romantic scenery along its banks has been celebrated by many poets. Near its mouth the waters of the Guadalaviar are led off into numerous canals, irrigating the plain around Valencia, and a large part of it serves as the water-supply of the city.

GUADALCAZAR, gwä'dȧl-kä'sär. A town in the Province of San Luis Potosí, Mexico, situated in an arid region about 40 miles northeast of the city of San Luis Potosí (Map: Mexico, J 6). It is important because of its mines of quicksilver. Population, about 8000.

GUADALQUIVIR, gạ'dȧl-kwĭv'ēr, *Sp. pron.* gwä'dȧl-kê-vēr' (Ar. *wād al-kebīr*, great river). Next to the Ebro the most important river of Spain. It rises in the Sierra de Pozo, in the eastern part of the Province of Jaen, and, after pursuing for a short distance a northeasterly course between that range and the Sierra de Cazoila, makes an abrupt bend, and flows in a generally west and southwest direction through the provinces of Jaen, Cordova, and Seville, emptying into the Atlantic Ocean 20 miles northwest of Cadiz, after a course of 350 miles (Map: Spain, C 4). Its upper valley is irregular and mountainous, but through the greater part of its course it flows through a wide and level plain, somewhat resembling the Pampas of Argentina. Here the river runs sluggishly, and for the last 70 miles of its course, as far as Seville, it is a tidal stream. Below Seville it divides twice, forming two large islands, called Isla Mayor and Isla Menor. At high water it often overflows its banks, and the whole region around its mouth is known as *Las Marismas*, or tidal marshes. The principal tributary is the Jenil, from the south. The middle valley is very fertile, and contains, besides the cities of Cordova and Seville, on the banks of the river, numerous towns and villages. The river, though navigable to Seville for ships of 1200 tons, is not much used as a waterway. The Guadalquivir figures largely in the legends, poetry, and history of Spain. It is the Bætis of the Romans.

GUADALQUIVIR, Marquis de las Marismas del. See Aguado, Alejandro María.

GUADALUPE, gwä'dȧ-lōō'pȧ. A river of Texas. It rises in Kerr County, in the southwest central part of the State, and flows southeast through pleasantly undulating prairie and forest regions past the towns of New Braunfels, Seguin, Gonzales, Cuero, and Victoria (Map: Texas, F 5). About 20 miles from its mouth it divides into two branches, the southern branch uniting with San Antonio River, and both emptying into San Antonio Bay, 140 miles southwest of Galveston. The length of the Guadalupe is about 250 miles, and steamers can ascend it to Victoria.

GUADALUPE HIDALGO, hê-dȧl'gô *or* ê-dȧl'gô, Treaty of. A treaty made between the United States and Mexico, at Guadalupe Hidalgo, a small place in the outskirts of the City of Mexico, February 2, 1848, at the close of the Mexican War. The American negotiator was Nicholas P. Trist, of Virginia, chief clerk of the Department of State, who had been sent by President Polk, in the summer of 1847, to the headquarters of General Scott for the purpose of entering into negotiations with the Mexican Government. At that time Trist was instructed to demand, among other things, the cession of New Mexico and the Californias and the recognition of the Rio Grande as the international boundary. During an armistice, in the month of August, commissioners of the Mexican Government met Trist and offered radically different counter-propositions, insisting also upon the Nueces as the correct boundary. Nothing came of these negotiations, and, upon the termination of the armistice, hostilities were resumed, and Trist was recalled. Nevertheless, he remained on the ground, and upon a suitable change in the military situation, negotiations were resumed in January, 1848, and on February 2d an agreement was reached in the Treaty of Guadalupe Hidalgo. Trist promptly returned to Washington, and President Polk submitted the treaty to the Senate on February 23d. After vigorous opposition on the part of some of the Senators, resulting in modifications which were accepted by Mexico, the treaty was ratified by the Senate on March 16th; ratifications were exchanged on May 30th, and the treaty was proclaimed on July 4, 1848. By the terms of the treaty in its final form, the Rio Grande was established as the boundary for the eastern portion of the cession, and in the west the lines of the Gila and Colorado were so followed as to give to the United States all the territory then known as New Mexico and Upper California. The United States agreed to pay to Mexico $15,000,000, and to assume the payment of all claims adjudged against Mexico under the conventions of 1839 and 1843. Furthermore, the United States assumed the payment of all claims, not exceeding in the aggregate $3,250,000, held by citizens of the United States against Mexico, and which originated prior to the date of the treaty. On July 29, 1848, Congress passed an act providing for the payment of the claims already liquidated, and on March 3, 1849, a commission was created to pass upon claims against Mexico held by citizens of the United States. By this commission 182 claims were allowed and 70 were rejected. For a map illustrating the cession, consult Channing, *United States of America*, page 135.

GUADALUPE (gạ'de-lōōp') **MOUNTAINS.** A mountain range between the Rio Grande and the Pecos River in Texas and New Mexico. It has a northwesterly trend, and may be considered as a southern continuation of the Rocky Mountains. The range has a maximum elevation of 5000 to 6000 feet above the sea.

GUADELOUPE, gą'de-lōōp', *Fr. pron.* gwâd'-lōōp'. The largest of the French West Indian islands, situated between the British islands of Dominica to the south and Montserrat on the north (Map: West Indies, Q 6). Area, 619 square miles. Guadeloupe is practically divided into two islands—Basse Terre and Grande Terre, separated by the Rivière Salée, an inlet four miles long and 100 to 400 feet wide. The two portions differ radically. Basse Terre, the western part, is mountainous, and reaches in its highest peak the active volcano of La Grande Soufrière, an altitude of about 5500 feet. It is of volcanic formation and intersected by a large number of volcanic streams. Grande Terre, the eastern part, on the other hand, has few elevations above 100 feet, is of calcareous formation, and depends for its water-supply mainly on ponds and marshes. The climate of Guadeloupe is hot and moist, and not unhealthful in the more elevated parts of the island. The mean annual temperature is nearly 80°. Guadeloupe, like most of the West Indies, has a fertile soil, and produces chiefly sugar, coffee, cacao, vanilla, rice, bananas, etc. Over 30 per cent. of the total area is under cultivation, and of that nearly 50 per cent. is under sugar. The sugar industry of the island, which had greatly declined with the abolition of slavery, has again revived as a result of the importation of coolies, and the annual output amounts at present to about 50,000 tons. Cotton, rubber, and tobacco are also cultivated to some extent. The forests of Guadeloupe, confined largely to Basse Terre, are quite extensive, abounding in campeachy or logwood. The commerce for 1889 amounted to 36,700,000 francs ($7,082,100), divided almost equally between exports and imports. Guadeloupe forms, together with the islands of Marie Galante, Les Saintes, Saint Bartholomew (Barthélemy), and a part of Saint Martin, a French colony, and is administered by a governor, an executive council of six, and a legislative council of thirty members. It is represented in the French Parliament by a Senator and two Deputies. The budget for 1900 balanced at about 5,000,000 francs ($965,000), and the subvention from the French Government amounted, in 1901, to 1,600,000 francs ($308,800). The population of the island of Guadeloupe, chiefly colored, was 182,112 in 1901, including about 15,000 coolies. Capital, Basse Terre (q.v.); chief commercial town, Pointe-à-Pitre, at the south entrance of the Rivière Salée.

Guadeloupe was discovered by Columbus in 1493, and settled by the French in 1635. During the latter half of the seventeenth century the colonists resisted several attacks by the British, who finally captured the island in 1759 and retained it until 1763. The island was again captured by the British in 1794 and 1810. In 1813 it was transferred to Sweden, and in 1816 was formally restored to France. Consult: *Annuaire de la Guadeloupe et dépendances* (Basse Terre); Boumais, *Guadeloupe physique, politique, économique, avec une notice historique* (Paris, 1881); Stoddard, *Cruising Among the Caribbees* (London, 1896); Ballet, *La Guadeloupe* (Basse Terre, 1890-96); Guesde, *La Guadeloupe et dépendances* (Paris, 1900).

GUADET, gwâ'dâ', Marguerite Elie (1758-94). A French orator and statesman, born at Saint Emilion. Already known as a lawyer, he was elected in 1791 to the Legislative Assembly, and became one of the leaders of the Girondists. Although anxious for every curtailment of the power of the King, he attacked his enemies, Marat and Robespierre, quite as violently when reëlected to the Convention in 1792. The proceedings he demanded against Marat ended in the latter's acquittal, and Gaudet took refuge in Saint Emilion with his family, where he was discovered and shortly afterwards guillotined at Bordeaux.

GUADIANA, gwä'dê-ä'nâ (Lat. *Anas*). One of the longest, but at the same time the narrowest and poorest in volume, of the five great Spanish rivers (Map: Portugal, B 3). The little river which has commonly been regarded as its head-stream, and which bears the name of Guadiana Alto, rises on the western boundary of the Province of Albacete, about eight miles northwest of the town of Alcarez. From its source it flows northwest for about 30 miles, after which it disappears among swamps, and, according to latest investigations, finds its way by a subterranean passage to the Záncara, a river which rises in the Province of Cuenca, and which should be considered the head-stream of the Guadiana. A short distance from the Záncara are situated a number of lakes, called Los Ojos (eyes) de la Guadiana, which were formerly believed to indicate the subterranean course of the Guadiana. The Guadiana pursues a westward course through La Mancha and the Province of Estremadura, until, passing the town of Badajoz, it bends southward, and flows in that direction through Portuguese territory, partly forming the boundary between Spain and Portugal, until it enters the Atlantic below the town of Ayamonte. It is about 520 miles in length, but is navigable for only 40 miles; it is, moreover, extremely difficult to enter from the sea, on account of the rapid changes which take place in the channels and bars of its delta. Its chief affluents are the Giguela on the right, and the Jabalón and Ardilla on the left.

GUADIX, gwâ-dēH'. A city of Spain, situated in the Province of Granada, on the river Guadix, about 35 miles east-northeast of Granada (Map: Spain, D 4). It is said to have been the first bishop's see in Spain. It contains the ruins of a Moorish castle and a cathedral. It has brandy distilleries and manufactures building materials; in the neighborhood are iron and copper mines. Population, in 1900, 12,616.

GUADUAS, gwâ-dōō'âs. A city in the Department of Cundinamarca, Colombia, situated in the fertile valley on the road between Bogotá and Honda (Map: Colombia, C 2), at 3100 feet above sea-level. The town lies in a district producing coffee and sugar, and abounding in asphalt deposits; its chief manufactures are leather and hats. Population, 9000. It was founded by a monk, who built a convent there in 1614.

GUAGUA, gwä'gwâ. A town of Luzon, Philippines, in the Province of Pampanga. It is situated about three miles southwest of Bacolor. Population, in 1898, 10,722.

GUAGUANCHE, gwâ-gwän'châ (Sp.-Am., probably from the native name). A small barracuda (*Sphyræna guachancho*), occasionally taken in the Southern United States.

GUAIACOL, gwī'ä-kôl (from *guaiac*, from Sp. *guayaco*, *guayacan*, from the Haitian or

South American name), or METHYL PYROCATECHIN, $C_6H_4.OH.OCH_3$. A preparation obtained by distillation of beechwood creosote, of which it contains from 60 to 90 per cent. It is a colorless, oily liquid, soluble in 85 parts of water and much more freely in alcohol, ether, glycerin, and oils. Its taste and odor strongly resemble those of creosote, but it is less disagreeable. Of its compounds, guaiacol carbonate is best known. This is a tasteless, odorless, white powder insoluble in water. Both guaiacol and its carbonate are employed as substitutes for creosote in the treatment of tuberculosis, being, in many cases, less irritating to the stomach.

GUAIACUM, gwī'ä-kŭm (Neo-Lat., from Sp. *guayaco, guayacan*). A genus of trees of the natural order Zygophylleæ, natives of the tropical parts of America, which have abruptly pinnate leaves, and axillary flowers on one-flowered stalks, often in small clusters. The trees are remarkable for the hardness and heaviness of their wood, generally known as lignum vitæ, but also as guaiacum wood, and sometimes as Brazil wood; as well as for their peculiar resinous product, guaiacum, often but incorrectly called gum guaiacum. The species to which the commercial lignum vitæ and guaiacum are commonly referred are *Guaiacum officinale* and *Guaiacum sanctum*, natives of the West India Islands, and of some of the continental parts of America. Guaiacum officinale is a tree sometimes 60 feet high, with two or three pairs of ovate, obtuse, and perfectly smooth leaflets, pale-blue flowers, a furrowed bark, and generally a crooked stem and knotted branches. Some species have been grown as ornamentals in Florida and southern California. It seems probable that other species supply part of the guaiacum wood and resin of commerce. At present the supplies are obtained chiefly from Cuba, Jamaica, and San Domingo. The wood is exported in billets about three feet long and one foot in diameter, of a greenish-brown color. This is the color of the heart-wood; the sap-wood is pale yellow. Guaiacum wood sinks in water, and is remarkable for the direction of its fibres, each layer of which crosses the preceding diagonally; annual rings are scarcely to be observed, and the pith is extremely small. It is much valued, chiefly by turners. Ship's blocks, rulers, pestles, and bowls (q.v.) are among the articles most commonly made of it. When rubbed or heated it emits a faint disagreeable aromatic smell; its taste is also pungent and aromatic. Shavings and raspings of the wood are bought by apothecaries for medicinal use. The bark is also used in medicine on the Continent of Europe, but not in Great Britain or America. The virtues of both wood and bark depend chiefly on the resin which they contain, and which is itself used in powder, pill, and tincture. It is an acrid stimulant, and has been employed with advantage in chronic rheumatism, skin diseases, and catarrh. It has also been highly praised as a preventive of gout. In the sixteenth and seventeenth centuries guaiacum was the remedy most in repute for syphilis. The resin sometimes flows spontaneously from the stem of the guaiacum-tree; it is sometimes obtained artificially. It is of a greenish-brown color, and has a brilliant resinous fracture. It has scarcely any taste, but leaves a burning sensation in the mouth. One of its most striking characteristics is that it is colored blue by its oxidizing agents. It contains guaiacic acid, which closely resembles benzoic acid, and yields on distillation certain definite compounds known as guaiacin, pyroguaiacin, and guaiacol.

GUAICURUAN, gwī-kōō'rōō-ăn'. A distinct stock of South American Indians living in the Gran Chaco. There are about twenty tribes of them, all of the same warlike, roving, equestrian habit. The best known of the tribes are the Abipone, Guaicuru, Mataguay, and Toba. The Guaicuru originally lived farther south upon the Paraguay River. They have a system of hereditary castes, distinguished by different colors used in painting the body, the ruling family painting with black. The men go naked, but the women wear a short skirt. They place large wooden labrets in the lower lip. They tend immense herds of cattle and horses, but refuse to cultivate the ground.

GUAJACON, gwä'hä-kōn'. The Cuban name for the various top-minnows of the genus Gambusia, exceedingly abundant in Cuba. See Plate of KILLIFISHES AND TOP-MINNOWS.

GUAJÁN, gwä-hän'. See GUAM.

GUAL, gōō-äl', PEDRO (1784-1862). A South American patriot, born in Caracas, Venezuela, and educated at the university in that city. He took part in the Revolution of 1810, was a member of the Legislature, and secretary to Miranda. After an exile of several years, he returned, was made Governor of Cartagena, and then Ambassador to the United States. In 1816 he joined Bolivar's revolt, and for some time acted as Minister of Finance and Foreign Affairs in the newly established Government. For many years he lived in retirement, which was broken only by a mission to Europe for Ecuador in 1837, resulting in the final acknowledgment of that State's independence by Spain. In 1858, while living quietly at Caracas, he was chosen President of a Provisional Government, established in opposition to that of Monagas; and again entered actively into political affairs, serving as president of the Council of State under the Castro Government. In 1859 he was elected Vice-President of the Republic of Venezuela, and succeeded, in the following year, to the Presidency, which he resigned on account of failing health in 1861.

GUALBERT, gwäl'bâr', or **GALBERT**, JOHN. See VALLOMBROSA, CONGREGATION OF.

GUALDO TADINO, gwäl'dô tä-dē'nô. A city in Central Italy, 58 miles southwest of Ancona. In the cathedral and in the city hall are paintings by Niccolò da Foligno. Near the city are the ruins of the ancient Taginæ, where Narses in 552 defeated and slew the Ostrogothic King, Totila. It markets oil, grain, and millstones. Population of commune, in 1881, 8477; in 1901, 10,055.

GUALEGUAY, gwä'lä-gwī'. A city in the Province of Entre Rios, Argentina, situated on a small tributary of the Paraná, 120 miles northwest of Buenos Ayres (Map: Argentina, F 10). It has tanneries and flour-mills, and in its vicinity are situated extensive slaughter-houses. It has railway communication with the more important towns of the province, and through Puerto Ruiz, 7 miles below, it exports a considerable quantity of animal products. It con-

tains a theatre, a library, and a branch of the National Bank. Population, 7700.

GUALEGUAYCHÚ, gwä'lâ-gwi-chōō'. A city in the Province of Entre Rios, Argentina, situated on the Gualeguaychú River, 12 miles from its junction with the Uruguay (Map: Argentina, F 10). The town has a library and a school, various milling establishments, important manufactures of beef extracts, and an active river trade. Population, 14,000.

GUAM, gwäm, or **GUAJÁN,** gwâ-hän'. The largest of the Ladrone Islands (q.v.), lying in the Pacific Ocean, and belonging to the United States. It is the southernmost of the group, and is situated in latitude 13° 30′ N., and longitude 144° 45′ E., about 1500 miles east of Manila, and nearly the same distance southeast of Yokohama. It is 31 miles long and from 5 to 7 miles wide, and has an area of about 195 square miles. The northern half consists of a level and barren plateau 250 feet above the sea, toward which it falls abruptly on all sides; the southern half is mountainous, and the whole island is surrounded by a coral reef, with here and there a break permitting entrance to the harbors, of which the largest and best is that of Apra, on the western coast. The climate is humid, with rain at all seasons, but not unhealthful. The indigenous flora is poor and little varied, the principal trees being the cocoanut-palm and the bread-fruit tree. Rice, sugar, and indigo are also cultivated, and the farms are well stocked with domestic animals imported by the Spaniards. Agriculture and fishing are almost the only occupations of the inhabitants, who consist chiefly of aboriginal Chamorros intermixed with Tagalos and Malays. The island is of little importance to the United States except as a naval station and port of transit between America and Asia, to which end the harbor of Apra is being extensively improved. The population, in 1898, numbered 9000, of whom more than half live in the capital, Agaña (q.v.). Guam was captured by the United States cruiser *Charleston* on June 21, 1898, and by the Treaty of Paris was ceded by Spain to the United States. Consult: Griffis, *List of Books* (with references to periodicals) *on Samoa and Guam* (Washington, 1901); Wheeler, *Report on the Island of Guam* (Washington, 1900).

GUAN, gwän (South American name). A gallinaceous bird of Central and South America, often domesticated. It belongs to the same family (Cracidæ) as the curassow, the guans constituting the subfamily Penelopinæ. They have been separated into seven genera, of which Penelope (16 species) and Ortalis (19 species) are the largest. All are rather large, varying from the body size of a grouse to that of a goose. Their plumage is mainly black, glossed with green, and varied with white and brown; nearly all have the throat bare, and many have pendent gular wattles. Their heads are often crested, and their tails are long and gracefully carried. They go about in large flocks, but separate into pairs during the breeding season, and spend most of their time in the high forest trees, descending to the ground in search of fallen fruits, insects, and the like. Their nests are placed in trees, on bushes, or on the ground. Only one species ranges sufficiently far north to enter the United States. This is the Texan guan or 'chachalaca' (*Ortalis vetula*, var. *McCalli*), which is a dark, glossy, olivaceous-green bird nearly two feet long; but one-half of the length is due to the graduated tail of twelve feathers. It is noisy in the breeding season (April), the name chachalaca being imitative of its notes, which are as harsh and loud as those of a guinea-fowl; and all the guans of a neighborhood join in a stentorian chorus at sunrise each morning. These birds may be easily tamed, and to a certain extent are domesticated about the rural villages; but there seems little probability of their becoming a really widespread and useful fowl. See Plate of GROUSE, ETC.

GUANABACOA, gwä'nâ-bâ-kō'â. A town of Cuba, situated a few miles east of Havana, on the Havana-Matanzas Railway line (Map: Cuba, C 3). It is built chiefly on a range of hills, and is surrounded by groves of trees, watered by numerous springs. It has a theatre, a lyceum, and a hospital. It was formerly an ancient Indian town, but the Indians were supplanted by Spaniards before the end of the sixteenth century. It received its town charter on August 14, 1743. In 1762 it was sacked by the English. Population, in 1899, 20,080.

GUANACO, gwâ-nä'kô (Sp., from the South American name *huanaco, huanaca*). The larger of the two wild species of the camel family inhabiting South America, of which the llama and alpaca are domesticated varieties. This animal (*Lama guanaco*) has more the appearance of a hornless goat-antelope than of a camel. Its back is flat and straight, its legs in fair proportion, its head small and neat, with long, pointed, expressive ears, and its tail reduced to a bushy stump. A full-grown male stands about four feet high at the shoulder, and is covered with a thick coat of long, almost woolly hair, pale reddish in color, and longest and palest on the under parts. Domestication and artificial breeding with reference to the improvement of this coat has produced the alpaca (q.v.).

The guanaco is distributed throughout South America wherever a temperate climate exists. It inhabits the valleys of the Andes as far north as Bolivia and Ecuador, in company with the vicunias (the other species of the genus, *Lama vicunia*), and there has habits very similar to its mountain-keeping relatives; but on the plains of Patagonia it ranges to the shores of the Atlantic and of Magellan's Straits, and moves about in herds. The pairing season comes in August and September, and the young are born in May and June. They feed upon the pungent herbage of the Patagonian deserts, as well as upon the bitter grasses of the Pampas, and furnish to the wandering natives their principal flesh food, and the only skins useful for clothing or tent-making, except those of the rheas. The Gauchos hunt them extensively also, and they form the principal prey of the puma, so that they take the place in South America of the antelopes of other plains regions. The guanaco also occurs on Tierra del Fuego and neighboring islands, and swims readily from one to the other. Over a large part of its habitat none but salt water is to be had, and this it drinks readily. One very curious circumstance in its history is its habit of resorting to certain places in river valleys when it feels ill, so that nearly all which die a natural death seem to do so at these spots. This has been plausibly explained as

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due to the influence of an instinct inherited from the time when the country was much colder, and whenever storms or other distress afflicted the animals, they were accustomed to seek a covert in the bushes which grew only alongside the sunken streams. Consult: Tschudi, *Reisen durch Sud-Amerika* (Leipzig, 1866-69); Darwin, *A Naturalist's Voyage* (London, 1860); Cunningham, *Natural History of the Straits of Magellan* (London, 1871); Hudson, *The Naturalist in La Plata* (London, 1892); Spears, *Gold Diggings of Cape Horn* (New York, 1895). See LLAMA; VICUÑA; Plate of CAMELS AND LLAMAS.

GUANAHANI, gwä'nä-hä'nê. The name given by the natives to the island on which Columbus first landed, and which he called San Salvador. It is identified by some with Cat Island, one of the Bahamas, while others believe it to be the present Watling's Island, belonging to the same group.

GUANAJAY, gwä'nâ-HĪ'. The chief town of the department of the same name in the Province of Pinar del Rio, Cuba (Map: Cuba, C 3). It is situated a short distance from the Puerto del Mariel, 20 miles west of Havana, and is the terminus of the Havana and Guanajay Railroad. It is surrounded by hills, and is one of the best health resorts in the province. Population, in 1899, 8796.

GUANAJUATO, gwä'nâ-HWÄ'tô. An inland State of Mexico, bounded on the north by the State of San Luis Potosí, on the east by Queretaro, on the south by Michoacan, and on the west by Jalisco (Map: Mexico, H 7). Area, 11,370 square miles. The State lies entirely within the great central plateau of Mexico, Anahuac (q.v.), whose average elevation is 6000 feet above the sea. The surface is mountainous in the northern half, where it is traversed by the Sierra Gordo and Sierra de Guanajuato, while the southern half is more level. The chief rivers are the Lerma and its two tributaries, the Laja and the Turbio. There are a number of lakes in the southern part of the State, and mineral springs abound. The climate is moderate in the plains and somewhat cold in the mountains. In the valleys and plains the chief industries are agriculture and stock-raising, while in the mountainous regions mining ranks first. The chief agricultural products are corn, wheat, barley, tropical fruits, and red pepper. The mineral wealth of the State is very large, silver, gold, mercury, tin, lead, and copper being represented. The annual output of the mines is valued at over $9,000,000. Guanajuato has a large number of small cotton and woolen mills, flour-mills, potteries, breweries, distilleries, etc. The State is traversed in three directions by the Mexican Central Railway, and also by two other lines. Guanajuato is one of the most densely populated States of Mexico; its population in 1900 was 1,065,317, or nearly 94 inhabitants per square mile. The capital is Guanajuato (q.v.).

GUANAJUATO, or **SANTA FÉ DE GUANAJUATO,** sän'tâ fā' dâ gwä'nâ-HWÄ'tô. The capital of the State of Guanajuato, Mexico, situated in the Cañada de Marfil, 6200 feet above sea-level and 165 miles northwest of Mexico (Map: Mexico, H 7). It is Oriental in general appearance; its streets are deep and tortuous, but the houses are well built, and the city contains many fine public buildings, the chief of which are the cathedral, the monasteries (eight in number), the college, the gymnasium, the theatre, and the mint. In the vicinity are numerous silver-mines, among the richest in all Mexico. It has manufactures of soap, chemicals, pottery, and some silverware. It has a fine system of waterworks. Population, 53,000. Guanajuato was founded in 1554, and under Spanish rule numbered over 100,000 inhabitants, receiving the title of city in 1741. It is one of the most historic spots in Mexico, having been originally distinguished by the heroic struggle of the natives of the region against Spanish conquest. In the great war for liberation against the mother country the city was the scene of the first great battle at the storming of the Alhóndiga de Granaditas (q.v.) in 1810. It was repeatedly sacked during the long war.

GUANARE, gwâ-nä'râ. Capital of the Venezuelan State of Zamora, situated near the River Guanarito (Map: Venezuela, D 2). It is a place of great importance in the cattle trade of the country. Its population is estimated at 11,000. Guanare was founded in 1593.

GUANCHOS, gwän'chôz (native *Guanchinet*, from *guan*, man + *Chinet*, Teneriffe). A Hamitic people, formerly numerous in the Canary Islands, associated with the ancient Canarii and Kamnurieh. Their subjugation by the Spaniards was completed about 1496, and they are now almost extinct. In craniological characters they approach the Cro-Magnon race of France, with subdolichocephalous skull, low forehead, and projecting jaws. Those who first described them say that they were a handsome people, tall, well built, athletic, and agile. Their complexion and hair were blond, but mixture with Arabs changed these characteristics in different islands. By their language and inscriptions they ally themselves with the Berbers of North Africa, and the ancient Numidians. Consult Wallach, in *Journal of the Anthropological Institute*, vol. xviii. (London, 1887-88).

GUANE, gwä'nâ, or **GUANES,** gwä'nâs. An inland town of Cuba, in the Province of Pinar del Rio, and judicial seat of its district, about 20 miles southwest of Pinar del Rio (Map: Cuba, B 4). It is a centre of tobacco and cotton production, cattle-raising, and cedar lumbering. Population, in 1899, 14,760.

GUANIDIN, gwä'nĭ-dĭn (from *guano*), CH_5N_3. An organic substance obtained in small quantities by the direct oxidation of proteids, and readily converted into urea; it is therefore possibly one of the intermediate products of the gradual disintegration of proteids in the animal body. Guanidin is a crystalline solid substance soluble in water and alcohol; it acts as a powerful base, forming crystalline salts by combination with one molecule of acid. Chemically guanidin is an imido-urea, its constitution being represented by the following structural formula:

$$C = \begin{cases} NH_2 \\ NH \\ NH_2 \end{cases}$$

Guanidin

It may be prepared synthetically by the action of ammonium chloride on cyan-amide in alcoholic solution. The most important derivatives of guanidin are kreatin and kreatinin (qq.v.), the

former being methyl-guanidin-acetic acid, the latter an anhydride of kreatin.

GUANIN, gwä'nin, $C_5H_5N_5O$. A yellowish-white amorphous substance, which derives its name from its being a constituent of guano. It also forms, however, the chief constituent of the excrement of spiders, has been found attached to the scales of fishes, and seems to be a normal constituent of the mammalian liver and pancreas.

With regard to its occurrence in guano, as it has not been found in the recent excrement of sea-birds, there is every reason to believe that it is formed by slow oxidation (from atmospheric action) of uric acid, much as uric acid can be made to yield urea and oxalic acid. In the pancreas and liver it probably represents one of those transitory stages of disintegrated nitrogenous tissues which are finally excreted by the kidneys in the more highly oxidized form of urea.

Guanin may be best prepared from Peruvian guano, which is for this purpose finely powdered and boiled with lime until the filtrate becomes colorless; the residue is then boiled with sodium-carbonate solution, the liquid is filtered and precipitated with acetic acid. To purify the guanin thus obtained, it is boiled with dilute hydrochloric acid, from which it is subsequently freed by the use of concentrated ammonia. Guanin is insoluble in water, ether, alcohol, and ammonia. By the action of oxidizing agents it is converted into guanidin, parabanic acid, and carbon dioxide. The presence of guanin may be analytically detected with the aid of concentrated solutions of potassium chromate and potassium ferrocyanide, the former reagent producing an orange-colored, the latter a yellowish-brown, crystalline precipitate, in solutions of guanin. When treated with nitrous acid, guanin is transformed into xanthin. The chemical constitution of guanin has been determined by Emil Fischer.

GUANO, gwä'nô (Sp. *guano, huano,* from Peruvian *huanu,* dung). A name applied to the excrementitious deposits of sea-fowl, such as pelicans, penguins, and gulls, which are found on certain coasts and islands where the climate is dry and the rainfall slight. The deposits sometimes contain, in addition to excrementitious matter, the remains of the birds themselves, as well as of seals, walruses, and various other animals. Although the use of guano as a manure is comparatively recent, dating from about the middle of the nineteenth century, its value in agriculture was well known to the Peruvians long before they were visited by the Spaniards, probably as early as the twelfth century. Alexander von Humboldt first brought specimens of guano to Europe in 1804, and had them examined by the best analytical chemists of the day. Since then numerous analyses have been reported. The most noted deposits of guano are those found in the vicinity of Peru; but valuable beds have been discovered in many other parts of the world—viz. in North America, West Indies, Australia, Asia, Africa, and certain islands of the Pacific. The deposits, however, occur mainly within 10° to 20° north and south of the equator. The quality and value of the guano commercially depend almost wholly upon the amount of decomposition to which it has been subjected by the action of the atmosphere. The fæcal matter of the fish-eating birds, which by its long accumulation forms the guano deposits, consists essentially of nitrogenous and phosphatic compounds, the former being chiefly ammonia salts and nitrates derived from the decomposition of the uric acid and urates which exist in the fresh excrements of the birds, as well as of undecomposed or partially decomposed uric acid and urates and other organic compounds. The ammoniacal salts and nitrates, and some of the phosphates, are soluble in water, and are readily washed away by rain. In dry climates, where very little rain falls, as in some parts of Bolivia and Peru, on the western coasts of South America, the deposit of excreta suffers very little from the action of the atmosphere, and retains nearly the whole of its nitrogenous and phosphatic compounds. Guanos, on the other hand, found in regions where rain falls freely, lose a great part of their soluble constituents, but remain rich in their less soluble constituents—the phosphates of lime and magnesia. Guanos may, therefore, be divided, according to their composition, into three classes: (1) Those which have suffered little from atmospheric action, and which retain nearly the whole of their original constituents, such as the Angamos and Peruvian guanos; (2) those which have lost a considerable portion of their soluble constituents, such as the Ichaboe, Bolivian, and Chilean guanos; (3) those which have lost nearly all their ammonia, and contain but little more than the earthy phosphates of the animal deposit. Many of these are largely contaminated with sand. In this class belong the African (excepting Ichaboe), West Indian, Kuria Muria, Sombrero, Patagonian, and Shark's Bay guanos.

Aikman classes guanos as nitrogenous and phosphatic, and gives the following data as to the composition of the deposits which were reported as still being worked in 1894:

COMPOSITION OF GUANOS

KIND OF GUANO	Nitrogen	Phosphoric acid
NITROGENOUS GUANOS	*Per cent.*	*Per cent.*
Saldanha Bay	9	9
Ichaboe	8	9
Pabellon de Pica	7	14
Punta de Lobos	4	15
Huanillos	6	13
PHOSPHATIC GUANOS		
Baker Island	.....	39
Enderbury	.....	37
Aves and Sidney Island	.....	34
Malden Island	.....	32
Browse Island	.....	31
Huon Island	.....	28

Of the more important deposits of nitrogenous guanos which have been exhausted, Angamos contained nitrogen 20 per cent., phosphoric acid 5 per cent.; Chincha, nitrogen 14 per cent., phosphoric acid 13 per cent.; Ballestas, 12 per cent. each of nitrogen and phosphoric acid; Macabi, nitrogen 11 per cent., phosphoric acid 12 per cent.; Corcovao, nitrogen 11 per cent., phosphoric acid 15; Independence Bay, nitrogen 7 per cent., phosphoric acid 12. Among the phosphatic deposits now exhausted, but of historical interest, were Maracaibo, or Monks, with 42 per cent. of phosphoric acid; Raza Island and Curaçao, 40 per cent.; Starbuck, 38 per cent.; Fanning Island and Howland, 34 per cent.; Mejil-

lones and Lacepede Island, 33 per cent.; Sombrero, 32 per cent.; and Jarvis Island, 20 per cent.

Until 1874 most of the so-called Peruvian guano was obtained from the Chincha Islands, situated about 12 miles off the coast of Peru, between latitude 13° and 14° S. Each of these islands is from 5 to 6 miles in circumference, and is of granite, formerly covered with guano, in places to a height of 200 feet, in successive horizontal strata, varying in thickness from three inches to a foot, and in color from a light to a dark brown. Sometimes, however, a vertical surface of upward of 100 feet of a perfectly uniform appearance was found.

As good Peruvian guano always commanded a high price, and there was a strong inducement to adulterate it, umber, powdered stones, various earths, partially decomposed sawdust, and other substances were used for this purpose, and specimens have been sold containing mere traces of the genuine article. Moreover, as the deposits become exhausted the quality deteriorates. For instance, certain of the Peruvian guanos originally contained as high as 14 per cent. of nitrogen, but declined to 3 to 4 per cent. as the deposits became worked out. To make good this deficiency, it has been a common practice to 'equalize' or 'rectify' the guano by the addition of ammonium sulphate. In view of this wide variation in composition and quality, large purchases of guano should be made only on guaranty of composition. As the chemical composition of natural guano is known, an artificial guano may be readily compounded by the admixture, in due proportions, of its constituents. The following mixture forms a good imitation of guano, 132½ pounds of it being considered equal in power to 1 cwt. of good Peruvian guano: 78¾ pounds of bone-dust, 25 pounds of sulphate of ammonia, 1¼ pounds of pearlash, 25 pounds of common salt, and 2½ pounds of dry sulphate of soda.

Guano formerly was largely used for all the cultivated crops on the farm, and is now when it can be procured. It was the first artificial fertilizer to be used in large quantities, and the remarkable benefits derived from its application led to a rapid extension of its employment and prepared the way for the general use of commercial manures and intensive culture. Guano is therefore of great importance historically, because of its influence on agricultural practice, although, as Aikman states, it is now largely a manure of the past. It is essentially a nitrogenous and phosphatic fertilizer, although it usually contains a small percentage of potash. When used continuously, therefore, and not supplemented by potash fertilizers, it may result in an undue exhaustion of the soil as regards potash, and a consequent refusal of the soil to respond to further applications of the guano. The practice, formerly common, of applying salt with guano tended to hasten this exhaustion of potash in the soil. Guano is especially valuable as a nitrogenous fertilizer. The nitrogen, being in a variety of forms, is supplied to the plant gradually and continuously throughout its period of growth without danger of serious loss by leaching.

At the beginning of the Civil War there were annually imported into the United States about 80,000 tons of guano, used chiefly in the South. The importation since has not been so large. In 1856 Congress passed an act giving to any American citizen who discovered a guano island the exclusive right to sell the guano. This stimulated the exploitation of deposits for a time to a marked extent; but the business has declined in recent years, due both to the exhaustion of deposits and to the utilization of cheaper sources of commercial fertilizers, such as the immense phosphate beds of the South. The total annual import into Great Britain in 1893 is estimated by Aikman as under 30,000 tons, while in 1855 it was over 200,000 tons.

The term guano is commonly applied to various other manures, such as fish-guano and bat-guano. The latter is the more or less altered accumulation of bat-manure found in certain caves. It sometimes contains as high as 9 per cent. of nitrogen and 25 per cent. of phosphoric acid, but is found in too limited quantities to be of much commercial importance. See MANURES AND MANURING.

GUANOALCA, gwä'nō-äl'kä (1530-91). An Araucanian cacique, born in the valley of Puren, Chile. Renowned for his victories over the Spaniards, he was elected commander-in-chief of the forces of the allied tribes in 1588, and was killed in the assault upon Marigueñu.

GUANO ISLANDS. A general term applied to the Chincha, Lobos, and minor groups of islands, off the coast of Peru, South America. They were so named from their large deposits of guano.

GUANTÁNAMO, gwän-tän'ä-mō (also called Santa Catalina del Saltadero, from the name of the mountains which surround it). An inland town in the Cuban Province of Santiago de Cuba, situated about 10 miles north of the Bay of Guantánamo (Map: Cuba, K 6). It is connected by rail with Caimanera, its port. It exports coffee, sugar, and lumber. It was founded at the end of the eighteenth century, largely by families of French descent from Santo Domingo. Population, in 1899, 28,063.

GUAPORÉ, gwä'pō-rā', or **ITENEZ**, ē-tā'näs. A river of South America, rising in Matto Grosso, Brazil, and flowing northwest between Brazil and Bolivia, to its confluence with the Mamoré (q.v.), an affluent of the Madeira (Map: Brazil, E 6). Its entire length is about 950 miles, and it is navigable for light-draught vessels to the town of Matto Grosso, which is less than 100 miles from the source of the river.

GUAQUE, gwä'kä. A wild Carib tribe on the Caqueta River, on the border between Colombia and Ecuador. They are intelligent, and skillful in gathering wax and in other occupations. The couvade is in force among them. No woman must be seen by men during her monthly period, and at the birth of a child she must withdraw from the household for three months, during all which time her husband observes strict seclusion. See COUVADE.

GUARÁ, gwä-rä'. A corrupt form of 'aguará' (q.v.).

GUARANA, gwä-rä'nä (Brazilian name), or BRAZILIAN COCOA. A dried paste made from the seeds of the *Paullinia sorbilis*. The dried seeds are reduced to powder, mixed with water to a stiff paste, and rolled into cylinders, which are then dried, forming a hard, brownish mass. The substance has an astringent, bitterish, but not unpleasant taste, and is largely used as a stimu-

lant by South American Indians. It is sometimes of the greatest service as a remedy for sick headache. The essential crystallizable principle of guarana, called *guaranine*, is identical with caffeine (q.v.) or theine; of this, guarana usually contains between 4 and 5 per cent.

GUARANÍ, gwä'rä-nē'. One of the most important of all the groups of Indian tribes in America. The term has two meanings, applying (1) to the Guaraní proper (warriors), living between the Paraná River and the Atlantic, and (2) to the immense linguistic family called Tupí-Guaraní, spread formerly over Uruguay, Paraguay, and Brazil, with ramifications in Bolivia and Peru. Their numbers have been greatly exaggerated, running up into the millions. The population of Paraguay and Uruguay is largely Guaraní, or has the blood of that people in its veins. They are not tall (average height, 63½ inches). They are dolichocephalic, and are also said to be light in color and to lack the coarse features of the average American tribes. The Guaraní were not, at the time of the discovery, altogether dependent upon hunting, but had developed peaceful arts and sedentary life. In one sense this made them an easy prey to both Spaniards and Portuguese, but it saved their lives and taught them new industries. The more vigorous, after enduring their oppressors for a century, moved up the branches of the Paraná into Bolivia, where they mingled with the Spaniards, learned their language, and developed a fine-looking breed. The Guaraní of Brazil, under the Portuguese Government, were settled on reservations, and have married with the whites, the mixed progeny being called Mamelucos. These are industrious and progressive in agriculture and arts. The manioc is their staple vegetable food, along with many wild roots and fruits. They hunt also a great variety of wild animals and catch fish. Poultry is reared, and besides dogs they have tamed parrots, swine, and ostriches. The villages are surrounded with a double line of palisades, and consist of a number of large communal clan houses, in which each family has its fire; in many of these houses there are no partitions.

Some of the tribes wear skin or network cloaks, and others a waist garment of feathers like a Scotch kilt. Their weapons are the bow and arrow and clubs. The bow when straightened is also used as a lance. The tribes on the wide streams make dugout canoes 20 or 30 feet long, capable of carrying 30 persons. They have a simple upright loom, and make netted hammocks. For bodily decoration they apply colored juice or clay, on which rude patterns are drawn; feathers of tropical birds are also used as ornaments. Drums, trumpets, and flageolets are their musical instruments.

The Tupí-Guaraní, scattered over the immense drainage area of the Rio de la Plata and the southern affluents of the Lower Amazon, had no political solidarity. They are most of them now either distinct tribes or groups, or settled down under different conditions with the white populations. If the stock originated in Central Brazil, it is easy to see how the Tupían portion followed the Amazon affluents to the northward, and the Guaraní portion moved southward along the Paraná.

The languages of the Guaraní, as well as their faces, are said to have Mongolian characteristics. Instead of the long, compact groups of sounds in which a whole thought is wrapped up, monosyllables abound, which have various meanings according to the intonation. But the most interesting fact about the Guaraní language is the importance which it early acquired through its adoption by the missionaries as the *lingoa geral* (general language), a kind of Chinook jargon, by means of which they put themselves into communication with tribes over an immense area.

In their religion the Guaraní do not differ from their kindred in both continents. Vicarious taboo is alleged to have been practiced; that is, if a child became sick, the relatives abstained from food which they thought would be injurious to the child. Eclipses were thought to be caused by a dog and jaguar trying to eat the planet. Consult: Martius, *Ethnographie und Sprachenkunde Amerikas* (Leipzig, 1867); Brinton, *The American Race* (New York, 1891).

GUARANTY, or **GUARANTEE** (OF., Fr. *garantie*, from *garantir*, to warrant, from *garant*, *guarant*, *warant*, warrant, from OHG. *giwerên*, Ger. *gewähren*, to grant). In its broadest sense, a contract by which one becomes legally liable for the debt, default, or miscarriage of another. In this sense, it is used interchangeably with *suretyship* (q.v.). Frequently it bears a narrower signification, denoting a contract to pay money or do an act upon the failure of another to pay or to do. In the former case the principal debtor and the guarantor or surety are bound, ordinarily by a single contract to the third person. In the latter case the guarantor's contract with the third person is separate and distinct from his principal's contract. A promissory note signed by A and B for A's debt is an example of the first class. A promissory note by A for his debt to which B adds a separate contract, by which he guarantees the payment of the note, illustrates the second class. There is some authority for the use of guaranty in a third and still narrower sense—as an undertaking, by the guarantor, to pay if the principal cannot; that is, to pay only upon proof of the principal's insolvency. If the guarantor's agreement is made at the same time with that of the principal, the same consideration will answer for both; but a guaranty of an existing debt or liability requires a new and distinct consideration.

At common law, a guaranty was equally enforceable whether written or oral. By sec. 4, ch. 3, 29 Charles II. (see FRAUDS, STATUTE OF) it must be in writing and signed by the party to be charged or his authorized agent, if it is "a special promise to answer for the debt, default, or miscarriage of another person." Ordinarily, a guaranty is such a promise, and thus within the statute; but it often happens that a transaction which partakes of the nature of a guaranty does not fall within the statute. The rules governing the construction of guaranties, the discharge of guarantors, and their rights against their principals will be considered under SURETYSHIP. Consult: Brandt, *Suretyship and Guaranty* (Chicago, 1891); De Colyar, *Law of Guarantees and of Principal and Surety* (3d ed., London, 1897); and the authorities referred to under CONTRACT.

GUARAUNO, gwä-rou'nô. A tribe of South American Indians, known to the English as Warraus, living in the delta of the Orinoco River,

Venezuela. They are dark in color and well shaped in body. They are also industrious farmers and skillful laborers, building their houses upon piles to guard against the overflowing of the river. It is said, however, that they prefer the uplands, having been driven to the swamps by the inroads of the Caribs. They are estimated to be from 6000 to 15,000 in number, and appear to constitute a distinct linguistic stock.

GUARD (OF., Fr. *garde*, from OF., Fr. *garder*, to guard, from OHG. *wartēn*, Ger. *warten*, AS. *weardian*, Eng. *ward;* connected ultimately with Gk. *ὁρᾶν*, *horan*, to look). A soldier detailed for and assigned as a sentinel or sentry. The term, used collectively, applies to a body of troops, under the command of an officer or non-commissioned officer, assigned for the protection of a military post, camp, or other locality under military jurisdiction. Guards may be divided into two general classes, the first embracing (1) outposts (q.v.); (2) interior guards, including stable guards; (3) detachments to protect laborers on military works; (4) armed working parties on such works—the second covering all other duties, in or out of garrison or camp. The proportion of men required for the guard in each regiment or corps is distributed among the companies by the regimental sergeant-major, and is called the detail, the strength of each detail being regulated according to the available number in each company as shown on the roster, which, under the supervision of the adjutant, the sergeant-major is required to keep. The company details are similarly assigned from the rosters kept by the company first sergeants. Officers are assigned according to rank and availability. When the headquarters of more than one regiment are concerned, or in the case of a small brigade in the field, where but one guard is necessary, details are made from the headquarters of the command. The detail relative to guard duty includes: Officer of the day, officer of the guard, sergeants of the guard, corporals of the guard, musicians of the guard, and privates of the guard. Where there is more than one guard, a field officer of the day is also detailed.

Guard-Mounting is the ceremony of inspection and review preliminary to the actual relieving of the old guard. The details fall in on their company streets or before their barracks, are examined by their first sergeants, and marched to the regimental parade ground, where the sergeant-major places them in the desired alignment, receives the first sergeant's reports, and in turn presents the detail and reports to the adjutant. The latter officer then directs the officers of the guard to take posts, the guard is formed and turned over to the officer commanding the guard for inspection, the adjutant exercising general supervision. During the inspection the band plays; on the conclusion of such inspection officers take post, the guard stands at the 'parade rest,' the adjutant orders 'sound off,' upon which the band playing passes in front of the officer of the guard, to the left of the line, and back to its post on the right, and ceases playing. The adjutant then reports to the officer of the day, before whom the guard is marched in review. After passing the reviewing officer the adjutant and sergeant-major return swords and fall out, the commander of the guard forms it into column of fours, the band retires, the guard field music taking its place. As the new guard approaches the guard-house the old guard is formed into line, and receives its relief with arms at the 'present.' The officers of the day face each other, salute, and exchange duties. The new guard, drawn up opposite the old guard, proceeds to relieve the old sentinels, receiving over the duties and responsibilities of the position. The old guard, having been completed, then marches past the new on its way to the regimental parade ground, where, after inspection, the company details are marched to their own quarters by the different company non-commissioned officers, and their tour of duty is completed. Except in special circumstances, the old guard is not available for other duties or parades within at least four hours of their dismounting guard.

GUARD, National. See Militia.

GUARDAFUI, gwär'dä-fwē', Cape (Lat. *Aromatum promontorium*). Next to Ras Hafun, most eastern point of the African continent, situated in latitude 11° 50′ N., and longitude 51° 16′ E. (Map: Africa, K 3). It forms the extremity of an immense promontory stretching seaward in a northeast direction, and washed on the northwest by the Gulf of Aden, and on the southeast by the Indian Ocean.

GUARD-BOAT. A picket or patrol boat. Also a boat sent by the guard-ship of a fleet or squadron to carry the orders, mail, etc., between the flagship (or ship of the senior officer) and the other vessels.

GUARDFISH. See Needlefish.

GUARDI, gwär'dē, Francesco (1712-93). An Italian landscape painter, born in Venice. He was a pupil of Canaletto, and like him painted Venetian scenes. Their works are sometimes confused, but Guardi's paintings are less finished than those of his master; his whole style is sketchier, more sparkling, and more picturesque, though architecturally less exact. He introduced processions of figures in brilliant colors, and peopled his pictures with animated groups in gay costume, all treated with unfailing spirit, and with every advantage of beautiful and harmonious color. His works are very numerous. The best of them are in Venice, but they are to be found in nearly all European galleries. "The Rialto, Santa Maria della Salute, Venice," is in the Metropolitan Museum, New York City.

GUARDIA, gwär-dē'ä, Tomas (1832-82). A Central American politician, President of Costa Rica, born in Bagáces, Guanacaste. He adopted a military career, and participated in the defeat of the Walker filibustering expedition in 1855. He was made colonel, and was Governor of Alajuela from 1866 to 1869, when he led a revolt against Jiminez, which resulted in his overthrow in 1870, and the establishment of Carranza as Provisional President, and Guardia as commander-in-chief of the army. Six months afterwards he succeeded Carranza as Provisional President, and toward the end of the year was elected President. From that time until his death he was virtually dictator of Costa Rica, and ruled with a strong hand. The interior of the Republic was much improved under his administration, although he saddled the country with an enormous debt by attempting to construct an interoceanic railway. He was reëlected in 1874 and 1878, and

died in office. He was defeated for a third reelection shortly before his death.

GUARDIAGRELE, gwär'dē-ä-grā'lā. A city in the Province of Chieti, Italy, 18 miles from the Adriatic and from Ortona, the nearest railway station (Map: Italy, J 5). It markets grain, olives, and vegetables, and has numerous fairs. Four miles from the town is a mineral spring, rich in bicarbonate of iron and magnesia. Population of commune, in 1901, 9493.

GUARDIAN. One having lawful care and control of the person or property, or both, of an individual who cannot take care of himself. This definition includes guardians of lunatics, idiots, habitual drunkards, spendthrifts, etc., though such a guardian is usually styled a 'committee.' It also embraces a guardian or overseer of the poor and many other custodians. But in its most usual acceptation the word guardian is employed to denote one who has the custody and care of the person or property, or both, of an infant, i.e. of a person under twenty-one years of age, during the whole or some part of his minority. Such guardians exist either, I., by virtue and operation of law, or II., by special appointment by parents or courts.

I. In the first class are (1) guardians *by nature;* (2) guardians *for nurture;* (3) guardians *in socage;* and (4) guardians *by estoppel.* (1) A guardian by nature is, in England, one who has the care and charge of the person, but not of the property of the heir apparent. The guardianship continues until the ward reaches the age of twenty-one. (2) In English law also a guardian for nurture is one who has the management of the persons only of all the children other than the heir apparent, until they are fourteen years of age. Both of these species of guardianship represent the natural right of parents to the custody and control of their children. They vest, therefore, in the father, or, upon his death or disability, in the mother. But in the case of illegitimate children the mother has the preference. In the United States, where all the children inherit equally, these two forms of guardianship are substantially the same, and are governed by the laws relative to the relation of parent and child. (3) Guardianship in socage, under the ancient law, pertained to both the person and estate of the ward. It arose when an infant under fourteen obtained land by descent, but might then extend to his personal property also. It devolved upon the infant's nearest of kin who could not possibly inherit the property. It ceased when the ward reached the age of fourteen if the infant elected to appoint another guardian. Otherwise it might continue. This form of guardianship is obsolete in most of the United States, and in those States where it is retained it is no longer necessary that the guardian shall be incapable of inheriting from the infant. (4) A person who officiously meddles with the property of an infant may be required by the court to account to the infant, the same as if he were in fact guardian. He is then said to be a guardian *by estoppel.* See ESTOPPEL.

II. Guardians appointed by parents or courts are now the most common. They include: (1) Testamentary guardians and (2) judicial guardians, and within the second class are embraced (*a*) guardians in Chancery, (*b*) guardians *ad litem,* and (*c*) guardians appointed by courts, by virtue of some statutory authority. (1) The English statute 12 Car. II., ch. 24, first gave to a father power to appoint by will a guardian of his minor children, born or unborn, and vested in such testamentary guardian control of both the person and the estate of the ward until he became twenty-one years of age. That statute is generally reënacted in the United States. Such a guardian is under the jurisdiction of equity, must account strictly for his acts, and is the recipient of a personal trust which cannot be delegated. (2) (*a*) The King of England early delegated his power, as *parens patriæ,* to appoint guardians for infants and other incompetent persons to the Court of Chancery, and that authority still exists in the Chancery Division. In the United States the same right is exercised by courts of equity, though frequently regulated and modified by statute. The guardianship lasts until the infant is twenty-one years old, but after he is fourteen his choice and wishes will be taken into consideration by the court in making the appointment. (*b*) It is also an inherent power of a court, before which an infant comes as a party, to appoint a guardian *ad litem* or special guardian for that particular suit. The appointee is usually an attorney-at-law. (*c*) It was only by force of statute that the English ecclesiastical courts acquired the power to appoint guardians for infants. And the same is true of probate and surrogate courts in America. That power is generally conferred on such courts in the United States, and in some States other designated courts are given the same authority, by special statutory enactment.

The authority of a guardian closely resembles that of a parent. He has in general the custody of the ward's person, the right to change his domicile, or bind him out as an apprentice, the direction of his education, secular and religious, and the power to deal generally with his personal property, and to sell and dispose of the same. But he cannot sell the real estate of the ward, though he may manage and lease it, and receive the rents and profits for the ward's benefit.

The duties of a guardian are summarized by the statement that, since he is in effect a trustee, he must act exclusively in the ward's interest, and must take no profit to himself by virtue of his position. He must keep the property productive, and invest in such securities only as are directly authorized by law or by the court. He is not obliged to support the ward, except out of the ward's property. His acts are closely scrutinized by the courts and he may be required, from time to time, to give an account of his dealing with the ward's property. The ward has generally one year after becoming of age in which to call the guardian to account. The guardian's compensation is usually statutory and by way of commissions.

The guardianship of the person terminates when the ward marries, and the better authorities hold the same to be true as to the property. The court which appoints a guardian may remove him for good cause. Guardians not judicially appointed cannot be removed by a court in England, but in the United States such power is generally vested in the courts by statute. For the guardianship vested in lords of lands held by military tenure under the feudal system in England, see TENURE. See also PARENT AND CHILD.

GUARDIAN, The. (1) A play by Massinger, licensed 1633, produced at Court with success, 1634, and published in 1655. (2) A comedy by Abraham Cowley hastily written on the occasion of Prince Charles's passage through Cambridge, where the poet was a fellow (1641), and printed in 1650. In 1658 it was revised under the title of *The Cutter of Coleman Street*, and published in 1663. (3) A periodical founded in 1713, in London, by Richard Steele. It was the successor of the *Spectator*, but was issued only from March to October. Of the 176 papers, 53 were written by Addison.

GUARDIAN ANGEL, The. A novel by Oliver Wendell Holmes (1867). The 'guardian angel' is Professor Gridley, who watches over the heroine. Like Holmes's other novels, it deals with psychological questions.

GUARD-SHIP. In a fleet or squadron, the duty ship of the day. She must provide a guard-boat which makes the rounds of the fleet or squadron one or more times a day carrying mail, orders, etc., to and from the flagship. She must also furnish additional special boats for this sort of service if called upon. She must furnish the patrol boats, if such are necessary, and are not supplied by other vessels of the fleet. An officer from the guard-ship boards all vessels entering port if so required by the senior officer present, and makes a report to him in regard to them. The guard-ship, during the twenty-four hours of the duty, hoists the guard-flag at the fore, and at night is distinguished by a red lantern carried at the truck.

GUARINI, gwä-rē'nē, Giovanni Battista (1538-1612). An Italian poet, born at Ferrara. On the termination of his studies at the universities of Pisa, Padua, and Ferrara, he was appointed to the chair of literature in the last, and soon after the publication of some sonnets obtained for him great popularity as a poet. At the age of thirty he accepted service at the Court of Ferrara, and was intrusted by Duke Alfonso II. with various diplomatic missions. Differences between him and the Duke induced him to withdraw from the Court of Ferrara about the year 1587. Having resided successively in Savoy, Mantua, Florence, and Urbino, he returned to his native Ferrara, and discharged one final public mission, that of congratulating Pope Paul V. on his election (1605). He died in Venice, whither he had been summoned to attend a lawsuit.

As a poet he is remarkable for refined grace of language and sweetness of sentiment, while his defects are occasional artificiality, due to an unnatural quintessence of conceit, a too constant recurrence of antithetical imagery, and an affected dallying with his pleas. His chief and most popular work, *Il pastor fido*, is regarded in Italy as a standard of elegant pastoral composition, and obtained a high measure of popularity on its appearance. The writer designed it as a tragi-comic pastoral; its first dramatic representation was in honor of the nuptials of the Duke of Savoy and Catharine of Austria (1585). It was not published until 1590, at Venice, and Guarini continued to make changes in it until the twentieth edition appeared at Venice in 1602. Altogether, some 120 editions of this favorite work have been issued; the best is that of G. Casella (Florence, 1866), containing an essay on the poet, which is also to be found in vol. ii. of Casella's *Opere* (Florence, 1884). Translations of the *Pastor fido* have appeared in very many modern languages. In its kind, the play has been surpassed only by the *Aminta* of Tasso. In editorial work Guarini prepared the *Scelte delle rime* of Tasso, published at Ferrara in 1582. Mention may be made, among Guarini's other works, of his *Compendio della poesia tragicomica*, published in 1601, and again in the 1602 edition of the *Pastor fido;* his dialogue, *Il segretario* (1594), on the duties of a secretary, and on matters of logic, rhetoric, etc.; the prose comedy *La idropica*, written about 1584 (published 1613); his *Lettere* (1593); the *Trattato della politica libertà* (first published in Venice, 1818). Consult: Rossi, *Battista Guarini ed. Il pastor fido* (Turin, 1886); Cian, in *Archivio veneto*, second series, vols. xxxii. and xxxiii. (Venice, 1886); Ruggieri's life of Guarini, published in the edition of the *Trattato della politica libertà* (Venice, 1818); Saviotti, *Guariniana* (Pesaro, 1888); M. W. Shelley, *Lives of the Most Eminent Literary and Scientific Men of Italy*, vol. ii. (London, 1835).

GUARINI, gwä-rē'nē, Guarino (1624-c.1683). An Italian architect, born in Modena. He was appointed architect to the Duke of Savoy, Carlo Emanuele II., and to his successor, and designed many public and private structures in Turin. These include the Church of San Lorenzo of the Theatins; the Sanctuary of the Madonna della Consolata; the mortuary chapel of the House of Savoy in the Church of San Giovanni; and the Church of Saint Philip Neri. All these are in the fantastic style of Bernini, which Guarini carried to the extreme of the baroque. He also designed the Church of Sainte Anne of the Theatins on the Quai Voltaire, Paris, since destroyed; and buildings in Prague, Lisbon, and Modena. He wrote *Architettura civile divisa in cinque trattati* (1737), and several other works on architecture.

GUARINO (Lat. *Varinus*) **DA VERONA,** gwä-rē'nō dä vā-rō'nä (1370-1460). A learned Italian of the Renaissance, especially influential in reviving the study of Greek. He studied under Chrysoloras at Constantinople, and after his return to Italy taught in many places, including Venice, Verona, Padua, Bologna, and Florence. At one period he was tutor to Prince Lionello of Ferrara, and acted as interpreter for the Council of Ferrara. He translated the first ten books of Strabo, and a portion of Plutarch; wrote a Greek as well as a Latin grammar, and commented on Aristotle, Cicero, Persius, Juvenal, and Martial. Consult: Rosmini, *Vita, Guarino* (Brescia, 1805-06); Sabbadini, *Guarino Veronese e il suo epistolario* (Salerno, 1885); *La scuola e gli studi di Guarino* (Catania, 1896); Woodward, *Vittorino da Feltre and Other Humanist Educators* (Cambridge, 1897).

GUARNERI, gwär-nā'rē, or **GUARNE'-RIUS.** A noted family of violin-makers of Cremona, Italy. The head of the family, Pietro Andrea (c.1630), learned his art of Nicolò Amati, for whom he worked from 1650 to 1695. —Giuseppe (1660-c.1730), son and successor of Andrea, was as much an imitator of Stradivarius as was his father of Amati.—Another son, Pietro, was also a violin-maker, but a much inferior workman to his father and brother.—The most famous member of the family was Giuseppe

ANTONIO (1683-c.1745), who was a nephew of Andrea, and a pupil of the famous Stradivarius. The letters 'I. H. S.' were written on many of his labels, in consequence of which he was popularly known as Guarneri del Gesù. Many reasons have been given by historians for the variable character of his work; the violins of his later days being of very inferior workmanship, while those of his medium period are regarded by connoisseurs as equal to those of Stradivarius. See VIOLIN.

GUASA, gwä′sȧ. One of the huge sea-bass or groupers of the tropical Atlantic, especially *Promicrops guttatus.* (See JEWFISH.) The word 'guasa' or 'guaza,' often corrupted in Florida into 'warsaw,' is the Spanish name of a similar fish first known in the Mediterranean, where it is called 'merou' by French fishermen; and both these names are given in the West Indies to various groupers (q.v.).

GUASTALLA, gwȧ-stȧl′lȧ. A city in North Italy, in the Province of Reggio nell' Emilia, about 20 miles northeast of Parma, on the right bank of the Po, in the marshy, fertile plain which is cut up by canals (Map: Italy, E 3). It markets rice, silk, cheese, and wine, and has a municipal theatre, a public library, and a bronze equestrian statue of Ferdinand I. of Gonzaga (died 1559) by Leone Leoni. Guastalla was founded in the seventh century by the Lombards, and the original form of its name was Wardastalla. Paschal II. held a council here in 1106. The Duchy (now circondaria) of Guastalla, of which this city was the capital, came into the possession of the Gonzaga family in 1539. After the death of Giuseppe Gonzaga without heirs in 1746, the territory was annexed by the Empress Maria Theresa, as an unoccupied fief; in 1748 it was handed over to the Duke of Parma. In 1796 it was captured by the French, and the next year became part of the Cisalpine Republic. In 1805 it was given as a principality to Napoleon's sister Pauline, and in 1814 was assigned by the Congress of Vienna, together with Parma and Piacenza, to Napoleon's wife, Marie Louise. Shortly after her death in 1847 it was annexed to Modena (q.v.). Population of commune, in 1881, 10,369; in 1901, 11,091.

GUATEMALA, gȧ′te-mä′lȧ, *Sp. pron.* gwä′-tȧ-mä′lȧ. The largest and most important of the five Central American republics, containing nearly one-half of their collective population, and leading them in the extent of its domestic and foreign commerce. It has a frontage of 200 miles on the Pacific and of 70 miles on the Caribbean Sea (Gulf of Honduras). It extends from latitude 13° 54′ to 17° 48′ N., and is bounded on the northwest and north by Mexico, on the east by British Honduras and the Gulf of Honduras, on the southeast by Honduras and Salvador, and on the south by the Pacific Ocean (Map: Central America, B 3). Its area (estimated) is 48,300 square miles.

TOPOGRAPHY. The Pacific coastal plain is somewhat broad in the west and quite narrow in the east near the coast of Salvador. At the foot of the mountains its slope is very noticeable, but nearing the sea it is almost level. It is also so low that in the rainy season lakes form which connect with the sea by channel, thus rendering their waters brackish (esteros). The Pacific ports, San José, Champerico, and Ocos, are merely open roadsteads. The Atlantic ports are Livingston and Puerto Barrios, the latter having a good natural harbor.

Three distinct topographic features mark the interior, crossing the country east and west. In the north is the broad, low, hilly plain of Petén, of Tertiary and Cretaceous formation, covered with forests and grasses, and still largely unexplored. In the centre the plain rises to a high plateau surmounted by the sedimentary ranges of the Sierra Madre system, which in their highest point attains an elevation of about 11,000 feet. The plateau is continued to the south, and is bordered along its southern edge by the volcanic mountains which skirt the Pacific coastal plain and are roughly parallel with the Pacific shore-line. This southern part of the plateau is covered deep with the débris of eruptive rocks and ash, forming plains of very rich and productive soil among the mountains. Accordingly, the most important agricultural districts are among the uplands of the south, and much nearer the Pacific than the Atlantic. Most of the volcanoes are extinct; but there have been recorded within the historic period severe eruptions of Tacaná (upward of 13,000 feet high), Cerroquemado, Fuego (upward of 12,000 feet), and Pacaya. Other volcanic summits are Agua, Atitlan, Tajumulco (seemingly the loftiest elevation of the land), Acatenango, and Santa Maria. Earthquakes are very frequent in the neighborhood of the volcanic belt, and some of them have destroyed many towns. The effects of a very destructive earthquake on April 18, 1902, which resulted in the partial destruction of the important city Quezaltenango, were recorded by seismographs all over the world; and the volcanic eruptions from the Santa Maria group that followed in late October buried a large area of coffee lands under several feet of the same volcanic ash that has contributed to make this southern portion of Guatemala one of the large coffee producers.

The volcanic belt forms the water parting between the Atlantic and the Pacific river systems. On the Pacific side the rivers descend the steep slopes as torrents to the narrow coastal plain, and there is no opportunity for the development of rivers useful for navigation. The Atlantic rivers, on the other hand, have a long and gentle slope; but they are of little consequence as water highways, though the Motagua, the most southern and important of the Atlantic group, is navigable for 100 miles. Other streams are the Polochic and the Usumacinta (on the Mexican frontier). There are many lakes without visible outlet in the Cretaceous rocks of northern Guatemala, the largest of which is Lake Petén, and among the eruptive rocks farther south are many beautiful mountain lakes. The largest lake of the Atlantic slope is Yzabal (the Golfo Dulce). It is shallow, considering its large area, but is navigated by steamers.

CLIMATE, FLORA, AND FAUNA. Lying wholly within the tropics, Guatemala would have a uniformly warm, moist climate if it were not for the great diversity of its surface in the central and southern parts. Here the differences in topography reach their maximum, with important effect upon climate, while the comparatively level areas of northern Guatemala and the Pacific coastal plain are under uniform tropical weather

conditions. The lower-lying districts, up to 2000 feet above the sea, are called the hot lands (Tierra caliente). The mean temperature is from 77° to 82° F. The population here is very small. Fevers are prevalent, and most of the hot lands are unsuitable for settlement by the white races. These are the regions of cacao culture, of the cocoa palm, and of rubber and mahogany forests. The healthful temperate regions (Tierra templada), forming the central and southern plateaus and plains among the mountains, are from 2000 to 6000 feet above sea-level. The zone between 2000 and 4000 feet, with a mean temperature of 68° to about 73° F., is the chief region of coffee culture. Less coffee is grown in the higher parts of the temperate lands, where the temperature has been known to fall to the freezing-point. The cold lands (Tierra fria), above 6000 feet, where the mean temperature is 50° to 63°, are adapted to the cultivation of wheat, the potato, and apple; and in particularly favored spots, well exposed to the sun, even oranges and bananas, which, with sugar-cane and cotton, are characteristic products of the lower altitudes, are successfully grown. Above 10,600 feet, among the highest mountains, where the mean annual temperature is under 50° F., there is no agriculture. Here are found Alpine conifers, and there is more or less mountain grazing. The tops of the highest mountains are treeless, and are sometimes covered with a little snow.

The Atlantic slope, swept to a considerable extent by eastern or northeast trade winds, has a larger rainfall than the Pacific slope, where the heaviest precipitation is on the southern slopes of the mountains. The driest regions are the plains among the mountains. These plains are partly screened by the elevations around them from rain coming from either ocean. Thus the inland district of central Guatemala has only about 27 inches of rain in a year, which is sufficient for agriculture, while the city of Guatemala, on the coast of the southern Cordillera, has 57 inches, and Tual, high on the Atlantic slope, 195 inches. The temperate lands, covering a large collective area in central Guatemala, are the great source of the country's agricultural wealth. Among the wild plants, the bamboo grows in thickets on the low-lying Pacific seaboard, and the dense forests of the northern hot land are famous for their magnificent orchids. Animal life is more abundant in the moist than in the dry regions. A number of mammals, including the tapir and peccary, inhabit the forests. The alligator, and thirty species of fish previously unknown, were found in Lake Petén. Some of the most dangerous snakes find a home in the forest undergrowth. There are very many species of birds, the most notable of which is the quezal or long-tailed trogon, "with an emerald-green silky plumage, dashed with a golden lustre above, with a lovely purple hue below, and a tail three feet long." This bird has been chosen as the national emblem of the Republic. Horses, mules, cattle, sheep, swine, and goats are important factors in the industrial life of the drier and cooler agricultural districts.

Agriculture and Minerals. The principal industry is agriculture, for which the country is well adapted on account of its fertile and well-watered soil, as well as its favorable climate. Government lands are sold at from $250 to $500 a caballeria (113.62 acres), or leased on favorable terms. The most important product is coffee, Guatemala producing half the crop of Central America, and being surpassed only by Brazil and the East Indies in the quantity harvested. The large destruction of plantations by the volcanic eruptions of 1902 will reduce the yield for some years. Coffee is cultivated by German and United States planters on very large plantations, and is also grown on a smaller scale by a great number of Guatemalans. The average annual yield in recent years has been about 65,000,000 pounds. In the lower regions where coffee is raised, the trees are shaded by the banana-plant, which also yields good crops. Cane-sugar yields an average of about 45,000,000 pounds, nearly all consumed at home, the rum distillers taking much of the crop. The cocoa product of northern Guatemala is about 700,000 pounds a year. Tobacco, indigo, rubber, vanilla, and sarsaparilla are also important. The output of cereals, confined to narrow areas in the higher lands, is insufficient for the domestic demand. Cattle on the plateaus yield hides for export, and the cotton-fields and high, dry sheep-pastures provide fibres for the spinners and weavers who ply their trades in the homes. The mineral deposits have received little attention, although the mining code encourages the industry. They include gold, silver, salt, iron, lead, and coal, of which only placer gold is obtained, to some extent, in the valley of the Motagua River.

Manufactures and Commerce. The manufacturing industries are only slightly developed, and are confined chiefly to the production of blankets, coarse cloth, straw hats, ponchos or cloaks, wooden and earthen wares, tobacco products, and leather goods. The transportation facilities are far from adequate. In many parts of the country there are merely paths on which trains of pack-mules furnish the only means of transportation. The railway lines, all owned by American and German companies, have at present a total length of about 400 miles. The Guatemala Central Railroad, connecting the capital, Guatemala, with the Pacific seaport of San José, and with a branch line connecting Santa María with Patulul, is 129 miles long. The Northern Railway is in operation from Puerto Barrios up the Motagua Valley to Rancho de San Agustin, a distance of 134 miles. With the completion of the portion (62 miles) from the latter place to Guatemala—a line under construction in 1903 by an American company—the capital will have a direct line of communication between the two coasts. Most of the railway bonds are guaranteed by the Government, and the companies are assisted by annual subventions, as well as by land grants. Puerto Barrios, the chief Atlantic seaport, is connected by steamers with New York and New Orleans. The Pacific ports have direct steam communication with San Francisco and Europe.

The chief article of export is coffee, which goes mainly to Germany, the United States (about one-eighth of the total export), and Great Britain. Besides coffee there are shipped hides and skins, bananas, rubber, and mahogany. The imports consist chiefly of cotton goods supplied by Great Britain, the United States, Germany, and France; railway materials, and telegraph and electrical supplies, chiefly from the United States; and building materials and iron manufactures, which are also supplied to a large ex-

tent by the United States. The value of the exports of Guatemala for 1899 amounted to $8,370,555 gold, a falling off since 1896, when it amounted to $10,037,193 gold. The imports for 1899 amounted to $4,117,659 gold, as against $11,429,200 in 1896. The commerce with the United States was for a long time greatly handicapped by the lack of direct steamship lines between the Pacific ports of the two countries. The establishment of a direct steamship line between San Francisco and Guatemala in 1900 has been followed by an increase in the United States imports to Guatemala from $785,462 gold in 1900 to $1,424,814 in 1901. The latter figure, however, still falls short of the exports from the United States in 1896, when they exceeded $3,000,000. The imports from Guatemala into the United States in 1900 amounted to over $2,000,000, consisting chiefly of coffee, bananas, hides, skins, and rubber.

Government and Finances. Guatemala has a democratic form of government, and is governed under the Constitution proclaimed in 1879. The executive power is vested in the President (who is elected directly for six years and is assisted by a Cabinet of six Ministers), and by a Council of State consisting of 13 members partly elected by the Assembly and partly appointed by the President. The legislative authority is vested in the National Assembly of 69 members, elected directly for a period of four years, at the rate of one Deputy for every 20,000 inhabitants. For the administration of justice Guatemala has a Supreme Court, consisting of a Chief Justice and four associate justices, elected by the people; six courts of appeals, consisting each of a Chief Justice and two associate justices, all elected by the people; and minor courts whose judges are appointed by the President at the recommendation of the Chief Justice of the Supreme Court. For governmental purposes the country is divided into 22 departments, which are subdivided into municipal districts. Each department is administered by an official called Jefe Político. He is appointed by the President. The municipal districts are administered by one or more alcaldes each, and by municipal councils, all elected by the people.

The regular army of Guatemala numbers about 7000 officers and men. The effective army is estimated at 56,000 men, and the reserve at 30,000. The metric system of weights and measures is in use.

The chief source of the revenue of Guatemala is customs duties. As the imports have declined about two-thirds since 1896, the revenue also has shown a considerable falling off. The receipts, which amounted in 1896 to $15,150,741 currency, were estimated in the budget of 1900-01 at $9,770,000, of which $4,340,000 was to be derived from customs. However, the expenditure also decreased from $17,437,452 in 1896 to $9,611,201 in 1900. The chief items of expenditure in the budget of 1900-01 were: For Department of Finance, $3,157,856; Departments of Interior and Justice, $1,421,524; War, $1,998,203; and Instruction, $1,513,915. The total foreign indebtedness of the country, including arrears of interest, amounted at the end of 1900 to $9,352,694 gold. It runs mostly at 4 per cent. interest, and is held in Great Britain and Germany. The internal debt amounted at the end of 1900 to $28,118,068 silver. Guatemala has six banks of issue, whose notes are legal tender even in case of debts contracted to be paid in silver. Guatemala is practically on a paper basis, gold and silver coins being little circulated. The value of the silver peso in United States currency fell from nearly $1 in 1874 to about 40 cents in 1902, while the paper peso is subject to frequent fluctuations, and for some time in 1902 was as low as 15 cents in United States currency.

Population. The inhabitants numbered 1,574,000 in 1900. The density of population is greatest on the high, cool plateaus. About 65 per cent. are Indians and negroes, and 35 per cent. are Spanish-Americans and mixed breeds, the last slightly exceeding the whites in number. The foreign population is only about 12,000, Guatemala being unable as yet, in spite of favorable legislation, to attract many immigrants. Nearly the entire population adheres to the Roman Catholic faith. There is no State religion. Perfect liberty of worship is granted. Education is free, and nominally compulsory. In 1895, 64,015 children were enrolled in 1284 schools. The educational system is the best in the Central American States.

History. Extensive ruins of cities, temples, and aqueducts found in all parts of Guatemala testify to the existence of a highly developed people before the advent of Europeans. The most careful study of these ancient remains, however, has as yet failed to reveal anything of the history of this prehistoric race, which was probably allied to, if not identical with, the Toltecs of Mexico. The country was conquered by the Spaniards, under Alvarado, between 1522 and 1524, and in no province of Spanish America were the natives so mercilessly oppressed as in Guatemala. Las Casas states that in the first fifteen or sixteen years of Spanish misrule between four and five millions of Indians perished. The province was governed as a captaincy-general under the viceroyalty of New Spain down to the declaration of independence in 1821. In 1822 Guatemala was declared annexed to Iturbide's Mexican empire, a status which lasted for fifteen months, and was followed by the creation of the Confederation of Central America, consisting of the five States of Guatemala, Honduras, Nicaragua, Salvador, and Costa Rica. In 1825 a federal constitution was adopted, and the confederation thus formed endured until 1838 or 1839. The new State of Guatemala then adopted a liberal constitution, and plunged into a condition of chronic warfare with its neighbors. Under the firm guidance of Rafael Carrera the country successfully withstood an attempt made by General Merazan in 1842 to establish an autocratic Government in Central America. In 1850 the republics of Honduras, Salvador, and Nicaragua endeavored to force Guatemala into a new confederation, but were decisively defeated at Arada. Since that time there has been an ever-present tendency to resolve the office of President into that of dictator, from the attempt of Carrera, who was made President for life in 1854 and maintained himself in office until his death in 1865, to José Maria Regna Barrios, who installed himself as dictator in 1897, and was assassinated in the following year. Nor has Guatemala been able to resist the temptation of effecting by force of arms a new union of the Central American States, and in 1885 Rufino Barrios, who had come into power in 1873, fell

in battle against the republics of Nicaragua, Costa Rica, and Salvador, which had formed an alliance for the preservation of their independent existence. The movement toward federation by peaceful means, instituted in 1895, came to naught after two years of negotiations. Since 1899 Manuel Estrada Cabrera has been President.

BIBLIOGRAPHY. Froebel, *Aus Amerika* (Leipzig, 1857-58); Marr, *Reise nach Central-America* (Hamburg, 1863); Squier, *The States of Central America* (London, 1868); González, *Geografía de Centro-América* (San Salvador, 1878); Fuentes y Guzman, *Historia de Guatemala* (Madrid, 1882); Stoll, *Guatemala: Reisen und Schilderungen aus den Jahren 1878-83* (Leipzig, 1886); Brigham, *Guatemala: the Land of the Quetzal* (London, 1887); Bernouilli, "Reise in der Republik Guatemala," in *Petermanns Mitteilungen* (Gotha, 1873); Child, *The Spanish-American Republics* (London, 1891); *Handbook of Guatemala*, revised, Bureau of the American Republics (Washington, 1897); Sapper, *Das nördliche Mittel-Amerika, Reisen und Studien 1885-95* (Brunswick, 1897); Maudslay, *A Glimpse at Guatemala* (London, 1899); Seler, *Auf alten Wegen in Mexiko und Guatemala 1895-97* (Berlin, 1900); O'Ryan, *Bibliografía de la imprenta en Guatemala en los siglos XVII y XVIII* (Santiago, 1897).

GUATEMALA, or **SANTIAGO DE GUATEMALA**, sän'tê-ä'gô dâ gwä'tâ-mä'lâ. The capital of the Republic of Guatemala, situated 85 miles from the Pacific coast on a plateau 5000 feet above sea-level. The city is regularly built, is well supplied with water by an aqueduct, and has electric lights, street cars, and all modern conveniences (Map: Central America, B 3). Its most notable buildings are the large cathedral, the episcopal residence, Government palace, and the university building, in which the law school and the national library are installed. The city has also schools of art, medicine, engineering, and agriculture, a conservatory of music, and several technical evening schools. Amusement is furnished by a theatre and an arena for bull-fights. Guatemala is the commercial centre of the country. It manufactures cotton and woolen goods, earthenware, gold and silver articles, cigars, and leather. Population, 73,000. Guatemala is the third capital of the country to bear that name. The first was founded in 1524, and was overwhelmed in 1556 by a volcanic eruption. It is now called Ciudad Vieja or Almalonga. The second capital, now known as Guatemala la Antigua, lies 25 miles west of the present capital, and was almost entirely destroyed by an earthquake in 1773, the date of the settlement of the present Guatemala.

GUATEMOTZIN, gwä'tâ-mô-tsēn', or CUAUHTEMOC (1502-25). The last Aztec Emperor of Mexico. He was only eighteen years old when he assumed charge of the operations against the invaders under Cortés, in November, 1520. He was a nephew of Motecuhzoma (Montezuma), and had been a leader of the party opposed to the latter's temporizing policy from the first arrival of the Spaniards. He organized the attack of the 'Noche Triste,' and after the return of Cortés Guatemotzin, who had succeeded Cuitlahuatzin as Emperor, carried on the defense of the City of Mexico throughout the spring and summer of 1521. When further efforts became vain, he tried to escape from Mexico with his remaining followers, but was captured. Cortés at first treated him with much respect, but, failing to secure from him any information regarding hidden stores of gold, which probably existed only in the minds of the Spaniards, put him to the torture of a slow fire. When Cortés started on his difficult march across Honduras, he took the most important of his native prisoners with him as hostages for the good behavior of their people. During the journey Cortés was informed that the Mexicans were planning a rising against the white conquerors. A summary trial was forthwith arranged, and Guatemotzin, together with the other prisoners, who had been a serious hindrance during the march, was executed in February, 1525.

GUATIVERE, gwä'tê-vā'rê. The name in the Spanish West Indies of a genus (*Bodianus*) of small, brightly colored, much-spotted fishes, which abound in tropical seas, and are good food. Two or three species occur along the Florida reefs, where they are called 'negro fish' from their blackish-olive hue. See JACOB EVERTZEN.

GUATUSO, gwâ-tōō'sô. A wild tribe, forming a distinct linguistic family on the Rio Frio, in the northern part of Costa Rica. They are a robust and athletic people, cultivating corn, bananas, and other crops, knitting hammocks and nets from agave fibre, but steadfastly rejecting the Spanish civilization, preferring to lead a free life. In consequence of the cruelties of the rubber-gatherers, they are rapidly dying out.

GUAVA, gwä'vâ (Sp., Port. *guayaba*, from Brazilian *guayaba*, *guaiva*, the native name). A shrub or small tree of the genus Psidium, native of the tropics of Asia and America, most common in the New World, and cultivated in suitable climates for its edible fruit. The lemon guava

GUAVA.
a, Psidium Cattleianum; *b*, Psidium Guajava.

(*Psidium Guajava*) is most commonly grown in Florida and the two Indies, attains a height of twenty feet, has numerous branches, obtuse, smooth leaves, two or three inches long, white fragrant flowers on solitary axillary stalks, and roundish or oblong smooth yellow fruit about the size of a hen's egg. The rind is thin and brittle; the pulp firm, flesh-colored, full of horny seeds, aromatic, sweet, and rather astringent. They, and the jelly made from them, are exported. The red guava, also referred to the same species, a plant common to both the Indies, bears a beautiful red fruit, with red flesh. Since it is acid and less agreeable than the lemon guava,

it is less in cultivation. Besides these, the strawberry guava (*Psidium Cattleianum*) produces a small claret-colored fruit of excellent flavor and good preserving qualities.

GUAVIARE, gwä′vē-ä′rā. One of the largest tributaries of the Orinoco, rising in the Andes not far from Bogotá, Colombia, and flowing eastward (Map: Colombia, C 3). It forms the boundary in Colombia between the departments of Cundinamarca and Cauca. The region through which it flows is mostly level and very sparsely populated. Length, over 700 miles; navigable through the greater part. In the present undeveloped state of the country it is of little economic value.

GUAVINA, gwä-vē′nä (Sp.-Am., probably from the native term). A name for sundry fishes of the goby family, common in the tropical rivers, and useful as food. Most of them belong to the genera Philypinus, Dormitator, Guavina, and Eleotris, and several are known in the Gulf States as 'sleepers'.

GUAYAMA, gwä-yä′mä. A town of Porto Rico, in the Department of Guayama, situated at the southeastern end of the island, about four miles inland (Map: Porto Rico, C 3). The anchorage off the shore, though only an open roadstead, is protected by a reef, and is much frequented. Population, in 1899, 5334.

GUAYAQUIL, gwä′yä-kēl′, or SANTIAGO DE GUAYAQUIL. A city, the chief seaport of Ecuador, situated on the west shore of the estuary of Guayas River at the head of the Gulf of Guayaquil, an inlet of the Pacific Ocean (Map: Ecuador, A 4). The town lies in a low plain, and is divided into two parts, the old and the new. In the old town the streets are crooked and ill-paved; in the new town they are well laid out, and lined by the residences of the richer class. The climate is unhealthful, and the water-supply is bad. The chief buildings and educational institutions are the cathedral, town hall, the college and technical school, and the hospitals. The town has a good harbor, protected by a breakwater, and the chief occupation is trade, both foreign and domestic. The city is the seat of the United States Consul-General to Ecuador. Its chief exports are cacao, coffee, quinine, gold, silver, and hides. Steamships go to all parts of the world, and the town has a number of shipyards ranking among the best on the Pacific coast of South America. Population, 45,000. Guayaquil was founded in 1535, and has often been the scene of battles between Government troops and insurgents.

GUAYAQUIL, GULF OF. One of the largest inlets of the Pacific Ocean, on the western coast of South America, in the southwestern part of Ecuador (Map: Ecuador, A 4). It is over 100 miles wide at its mouth, and narrows into an estuary of Guayas River, the entrance to the narrower part being divided by the island of Puna. Above the island the gulf is too shallow for ocean steamers, and communication with the city of Guayaquil is maintained by smaller vessels.

GUAYAS, gwä′yäs. A river of Ecuador, South America, rising in the western chain of the Andes, and flowing in a southwestern direction into the Gulf of Guayaquil (Map: Ecuador, B 4). It is navigable for small steamers as far as the city of Guayaquil.

GUAYMAS, gwī′más. A seaport of Mexico, situated on the Gulf of California (Map: Mexico, C 4). It is the chief trading centre of the State of Sonora, and a leading Pacific port of Mexico; it has railway and steamship connection with the United States; exports gold, silver, pearls, and hides, and is the residence of a United States consular agent. Population, 6000.

GUAYMI, gwī′mê. A tribe, probably of Chibchan stock, inhabiting the Veragua and Chiriquí districts of Colombia, extending across to the Isthmus of Panama, from ocean to ocean. Their ancestors are supposed to have been the makers of the numerous gold, copper, and silver relics dug up in recent years from the Indian burial-places of this region.

GUAYRA, gwī′rä, LA. A city in Venezuela. See LA GUAYRA.

GUAZU, gwä′sōō. The word in the vernacular of Eastern South America for any of several deer. When used alone it usually refers to the marsh-deer (*Cervus palustris*), a species closely resembling the Virginian deer, and commonly found between the Atlantic coast and the Paraná River. The 'guazuti' is the Pampas deer (*Cervus campestris*); 'guazu-pita,' the red brocket (q.v.) of Brazil; and 'guazu-viva' is another brocket, probably *Cervus nemorivagus*. Compare GUEMAL.

GUBAT, gōō-bät′. A town of Luzon, Philippines, in the Province of Albay. It is situated near the eastern coast, about 52 miles southeast of Albay. Population, 13,360.

GUBBIO, gōōb′bê-ô (Lat. *Iguvium*, mediæval *Eugubium*). A city in the Province of Perugia, Central Italy, 70 miles southeast of Arezzo (Map: Italy, G 4). It is mediæval in appearance, and is picturesquely situated on the slopes of the Apennines. The most conspicuous building is the Palazzo dei Consoli, a huge Gothic structure with pinnacles and tower, dating from the fourteenth century. In the twelfth-century cathedral and other churches are important frescoes and paintings. The Residenza Municipale contains ancient and modern majolicas, and the Eugubian tablets that were discovered in 1444 near the ancient theatre. (See EUGUBINE TABLETS.) Gubbio has a municipal theatre. It markets cattle, grain, wine, oil, linen, and lumber, spins silk, and manufactures majolica, for which it has been famous since 'Maestro Georgio' discovered his carmine finish. An interesting procession is that of the Ceri, on May 15th. Population of commune, in 1881, 23,316; in 1901, 26,320.

GUBEN, gōō′ben. The capital of a circle in the Prussian Province of Brandenburg, situated at the confluence of the Lubis with the Neisse, 30 miles south-southeast of Frankfort-on-the-Oder (Map: Prussia, F 3). It has cloth-mills, spinning and dyeing establishments, tanneries, potteries, and machine-works. Vines and fruit are cultivated in the vicinity, and some brown coal is mined. Guben passed, with Lower Lusatia, from the possession of Saxony to that of Prussia in 1815. Population, in 1890, 29,328; in 1900, 33,122.

GUBERNATIS, gōō′bër-nä′tês, ANGELO DE, Count (1840—). An eminent Italian littérateur, born at Turin. He studied at the University of Turin, and in 1862 was sent by the Government

to Berlin to perfect himself in philology. In 1863 he was appointed, as professor extraordinary, to the chair of Sanskrit in the Istituto degli studj superiori at Florence, and in 1869 he became full professor. He was attracted by the socialistic theories of Bakunin, and not long after his first appointment vacated his chair, that he might be free to carry out those views, but he soon discarded them, and after some hesitation was reappointed in 1867. He was called to the University at Rome in 1891. De Gubernatis has been active as a dramatist, lyric poet, journalist, critic, Orientalist, and mythologist. His early works were contributions to Sanskrit scholarship. The *Zoölogical Mythology*, published in London (1872), gave him a European reputation. Among his scientific and literary works may also be mentioned his dramas, such as the trilogy *Il re Nala* (1859), the *Don Rodrigo* (1861), the *Drammi indiani* (1872), the *Savitri* (1877); his works dealing with Oriental studies, as, for example, the *Piccola enciclopedia indiana* (1867), the *Fonti vediche dell' epopea* (1868), the *Mitologia vedica* (1874), the *Manuale di storia della letteratura indiana* (1882); his investigations into mythology, such as the *Manuale di mitologia comparata* (1880); his important biographical compilations, the *Dizionario biografico degli scrittori contemporanei* (1879-80), and the continuations since 1888 (cf. the *Dictionnaire international des écrivains du jour*, 1888), the *Ricordi biografici* (1873), the *Dizionario degli artisti italiani viventi* (1889-92); and the great history of literature and anthology entitled *Storia universale della letteratura dai primi tempi e presso tutti i popoli civili fino ai nostri giorni, con florilegi da ogni letteratura* (1882-85). He founded and carried on many periodicals and reviews; e.g. *La letteratura civile* (1859); *La civiltà italiana* (1865); *Rivista orientale* (1867-68); *Rivista europea* (1869-76); *Bollettino italiano degli studj orientali* (1876 et seq.); *Revue internationale* (1883-87). A contributor to many reviews, he also has directed the *Giornale della società asiatica italiana* since 1887.

GUDDEN, gōōd'den, BERNHARD VON (1824-86). A German physician, born at Cleves, and educated at Bonn, Berlin, and Halle. He specialized in the care of the insane; became assistant physician at the asylums in Siegburg and Illenau; then director of an establishment near Würzburg, and in 1869 professor of psychiatry at Zurich. From this position he went in 1872 to a like chair at Munich, where he also had charge of the district insane asylum of Upper Bavaria. Ennobled in 1875, he became physician to Prince Otho of Bavaria, and had charge of the mad King Louis II., with whom he died (1886) in the attempt to keep him from suicide by drowning in the Starnbergersee. His works include: *Beiträge zur Lehre von der Scabies* (2d ed. 1863); *Experimentaluntersuchungen über Schädelwachstum* (1874); and the posthumous papers collected by Grashey (1889). With Westphal he edited *Archiv für Psychiatrie und Nervenkrankheiten* (1868 et seq.).

GUDE, gōō'de, HANS (1825-1903). A Norwegian painter, born at Christiania. He was a pupil of the Düsseldorf Academy, and was appointed a professor there in 1854. In 1862 he went to England. Two years later he was made professor at Karlsruhe, and afterwards was appointed to a similar position at the Berlin Academy (1880). Among his numerous works are "Bridal Procession on Hardanger Fjord" (1848); "Summer Evening on Norwegian Lake" (1851); "Calm Sea," "Norwegian Harbor of Refuge" (1873); and "Harbor of Christiania" (1881). They are characterized by solid composition and good color.

GUDGEON, gŭj'on (Fr. *goujon*, It. *gobione*, from Lat. *gobio*, from Gk. κωβιός, *kōbios*, gudgeon). A fish (*Gobio fluviatilis*) of the carp family, Cyprinidæ, resembling the chub. It is very common in the streams of Europe, particularly such as have gravelly bottoms and occasional pools and rapids. It is about eight inches long, has large scales, a barbule at the angle of the mouth, and a forked tail. The upper parts are brown spotted with black, and white below. The gudgeons swim in shoals, feed on worms, mollusks, and other small animals, are ready biters, and are easily caught. Many are taken with the casting net in shallow water and kept alive in the markets until sold. They are excellent food. There are other species in Europe. Nearly related species occur in America, but they are not known by this name.

GUDIN, gü'dăn', THÉODORE (1802-80). A French landscape and marine painter. He was born in Paris, August 15, 1802, and studied for some time under Girodet-Trioson. Under Louis Philippe and Napoleon III. he was marine painter to the Court. In 1838 he was commissioned by the Government to paint a cycle of ninety pictures glorifying the French Navy for the Gallery of Versailles. His first works were fine in color and spirited in execution, but he soon lapsed into inferior work. His chief paintings are: the "Burning of the *Kent* in the Bay of Biscay" and the "Hurricane of Wind in the Roadstead of Algiers, January 7, 1831," both in the Louvre. Gudin was commander of the Legion of Honor and received many foreign decorations. He died at Boulogne-sur-Seine, April 11, 1880.

GUDRUN, gōō-drōōn'. The chief of the Low German epic sagas, taking the place of the Nibelungen saga in High Germany. The legend is preserved only in a High German poem by an unknown author. It tells how King Hagen of Ireland had a daughter, Hilde, whose suitors he was wont to kill. Undiscouraged, King Hettel of Denmark sends a secret embassy, who persuade the willing maid to flee with them to him over sea. Hettel meets the bride on the shore, but the father is in hot pursuit. There is a fight on the beach. Hettel saves Hagen's life, and there is a happy reconciliation. This is the prelude. Hilde has a daughter, Gudrun. She, too, loves a foreign prince, Herwig of Zealand; but while her father is away 'fighting the Moors,' a rival, Hartung of Normandy, carries her away. As before, the father pursues on his return and with him Herwig. There is another fine battle scene. Hettel is killed, and Hartung carries away Gudrun for seven years' hard captivity, soothed by Hartung's sister, Ortrun, and terminated by a rescue through her lover and her brother Ortwin, all ending as before in a reconciliation. We have a higher stage of moral evolution, a more Christian standard than in the *Nibelungenlied*, and so, naturally, in the course of the epic there is a more thoughtful insight into the complex aspects of human nature. There is also a more

delicate humor, though not the effeminate sentimentality of some other epics in this cycle. The time of the Gudrun saga is evidently that of the Danish raids on the English and Irish coasts. The subject is as old as the stories of Europa and Helen, but it was essentially a story of the seaside. Hence, though it was the more artistic, it appealed less to popular taste, and was not like the *Nibelungenlied* subjected to popular revision and extension. It had its origin, like the other, in epic songs, but it had an original poet for its author, and shows a constructive development by conscious plan. Thus it stands between the true popular epic and the studied epic of the Court. The best modern edition of the *Gudrun* is by Martin (Halle, 1902). There are translations into modern German by Simrock (1843); Klee (1878); Weitbrecht (1884, a paraphrase); L. Freytag (1888); Lemmermayer (1890); and Legerlotz (1900). Consult Wilmanns, *Die Entwickelung der Kudrundichtung* (Halle, 1873).

GUEBERS, gē'bērz *or* gā'bērz. See GHEBERS.

GUÉBRIANT, gâ'brē'äN', JEAN BAPTISTE BUDES, Count de (1602-43). A French marshal, born at Plessis-Budes, in Brittany. He fought first in Holland, then held a command in the French troops that formed a portion of the German army in the campaign in the Lower Palatinate, and conducted the passage of the Rhine (1639). After the death of Duke Bernhard of Saxe-Weimar, its leader (1639), the army fought under the French banners with Guébriant in command. He defeated the Imperial troops at Wolfenbüttel (1641), and at Kempen (1642), where he was made marshal. At the siege of Rottweil, in Swabia, he was mortally wounded and died in the surrendered city (1643).

GUEBWILLER, gâb'vē'lâr'. A town in Upper Alsace, Germany. See GEBWEILER.

GUELDER, gĕl'dēr, or **GUELDRES ROSE** (from *Gelderland*, *Gelderen*, a Dutch province where this rose was supposed to have originated). A cultivated variety of the high-bush cranberry (*Viburnum Opulus*—see VIBURNUM), in which the flowers are all barren, and instead of forming flat cymes, as in the wild plant, form much larger globose corymbs. It is sometimes called the snowball tree. When abounding in flowers, it is a very ornamental shrub, and is therefore very often planted.

GÜELL Y RENTÉ, gōō-âl'y'ĕ rān-tā', JUAN (1815-75). A Cuban author, born and educated in Havana. When twenty years old he went to Spain and enlisted in the army, where he served for a number of years. When he returned to Cuba he was for several terms sent as a representative of the island in the Spanish Cortes. He published a volume of poems, *Hojas del alma* (1844); *Ultimos cantos* (1859); and *Noches de estío* (1861).—His brother JOSÉ (1818-84) was born in Havana, and was sent to Barcelona to be educated. After several years spent in practicing law in Cuba, he returned to Spain in 1848, and married Doña Josefa Fernanda, the sister of the King consort, in spite of royal opposition. This resulted in his banishment, and for several years he lived in Paris, where he was active in the liberal and republican conspiracies in connection with Spain. He published *Amarguras del corazón* (1843); *Lágrimas del corazón* (1846); and *Leyendas americanas* (1856), all poetry in Spanish, several novels in French, and an historical work, *Philippe II. et Don Carlos devant l'histoire* (1878).

GUELPH, gwĕlf. The chief city of Wellington County, Ontario, Can., on the river Speed and the Grand Trunk and the Canadian Pacific railways, 48 miles west of Toronto (Map: Ontario, C 4). It is an inland port of entry, the seat of a United States consul; has abundant water-power, and a large number of piano, organ, sewing-machine, agricultural implements, carriage, and other factories. It is a stock-raising centre, and is the seat of the 'Canadian Cirencester,' the Ontario Agricultural College, and its experimental farm. Guelph was founded by John Galt, the Scotch author (q.v.). Population, in 1891, 10,537; in 1901, 11,496.

GUELPH FUND. The name given to the sum granted by the Prussian Government, in 1867, to the deposed King of Hanover, George V., but withdrawn in 1868, on the latter's continued refusal to renounce his right to the throne. It amounted to about $12,000,000, and the income of it was kept by Prussia till 1879, when part of it was given to the widow and daughters of the King. The Duke of Cumberland, son of George V., acquired the entire income in 1892, on renouncing explicitly any intention of intriguing against Prussia. While Prussia administered the fund the income was said to have been used in combating the Guelph intrigues; and the suspicion that Bismarck employed it for corrupt purposes, such as bribing the press, won for it the nickname of the 'Reptile Fund.'

GUELPHIC (gwĕl'fĭk) **ORDER.** An order of knighthood for Hanover, instituted by George IV., when prince regent, on August 12, 1815. It became extinct in 1866. It was both a military and civil order, unlimited in membership, comprising five classes, Grand Cross, Commander of the first and of the second class, knight, and simple member. The grand mastership was vested in the Crown of Hanover. The badge of the order was an eight-pointed cross of gold, with lions between the arms and surmounted by a crown; in the centre was the white horse of Hanover surrounded by a blue circle, and the motto, *Nec Aspera Terrent*.

GUELPHS, gwĕlfs, **AND GHIBELLINES**, gĭb'ĕ-lĭnz. The names of two great political parties, whose contentions and wars distracted Northern and Central Italy in the latter part of the Middle Ages. The designation Guelph (Ital. *Guelfo*, pl. *Guelfi*) is commonly supposed to be derived from Welf, the name of a princely family of Germany, which rose to great power in the twelfth century, when it was the rival of the House of Hohenstaufen, which occupied the Imperial throne. The most famous of the rulers of the House of Guelph was Henry the Lion, Duke of Saxony and Bavaria, who defied the power of the Emperor Frederick Barbarossa, and who was finally deprived of most of his possessions in 1180-81. The origin of the designation Ghibelline (Ital. *Ghibellino*) is altogether uncertain. A theory which has been widely accepted, but which rests on an insufficient basis, is that it became current as a modification of Waiblinger ('men of Waiblinger,' one of the possessions of the Hohenstaufen in South Germany), the name, used as a battle-cry, under

which the followers of Conrad III. (the first of the Hohenstaufen emperors) are said to have figured in the battle of Weinsberg, in which Welf VI., uncle of Henry the Lion, was defeated in 1140. About the beginning of the thirteenth century we find the names Ghibellines and Guelphs in use in Italy. The former may, in general, be described as the upholders of the Imperial authority in Italy (or, at the beginning, the supporters of the Hohenstaufen), the latter as the opponents of the Emperors. The opposition to Imperial authority in Italy arose from two distinct parties, which, for the most part, made common cause with each other—from the Church, which sought to assert its independence of the emperors, and from the principalities and city republics, which contended for their provincial or municipal rights and liberties. The Guelphs may therefore, in a measure, be said to have represented the National party. Florence, Bologna, and Milan took, as a general rule, the side of the Guelphs; while Pisa, Verona, and Arezzo were Ghibelline. Florence, especially, was the great stronghold of the Guelphs. The great Italian families in like manner took opposite sides, but the policy of each family frequently varied. As a rule, the nobles of the more northern districts of Italy inclined to the Ghibelline side, while those of the central districts were Guelphs. By degrees, however, and especially after the downfall of the preponderance of the German emperors in Italy, the contest ceased to be a strife of principles, and degenerated into a mere struggle of rival factions availing themselves of the prestige of ancient names and traditional or hereditary prejudices. In 1334 Benedict XII. practically disallowed altogether the reality of the grounds of division between the parties, by proscribing, under pain of the censures of the Church, the further use of those once-stirring names, which had long been the rallying words of a sanguinary warfare. After the fourteenth century we read little more of Guelphs or Ghibellines as actually existing parties. Consult: Browning, *Guelphs and Ghibellines* (London, 1893); Trollope, *History of the Commonwealth of Florence* (London, 1865); also the general works on mediæval history referred to under ITALY and GERMANY. See FLORENCE; HOHENSTAUFEN; ITALY.

HEAD OF GUEMAL.

GUEMAL, gā-māl′ (South American name). Either of two species of small deer confined to the Andes. They are distinguished from other deer (as the subgenus Furcifer) by their antlers, which have but a single forking, of which the front prong is the longer and projects straight forward, by the tusks in the upper jaws of both sexes, and also by the uniform coloration of the fawns. One species (*Cervus Chilensis*) inhabits Southern Chile, and the other (*Cervus Antisiensis*) the highlands of Peru.

GÜEMEZ PACHECO DE PADILLA HORCASITAS, gwā′māth pā-chā′kō dā pā-dē′lyā ōr′kā-sē′tās, JUAN VICENTE, Conde de Revillagigedo (1740-99). A Spanish administrator, born at Havana, Cuba. He won military distinction in the Peninsular wars, and in 1789 was appointed Viceroy of Buenos Ayres. Soon afterwards he was transferred to the Viceroyalty of Mexico, in which post he was continued until 1794. His administration was among the most beneficent in the history of Spanish rule in Mexico. Afterwards he was Director-General of the Artillery of the Spanish Army.

GUENDOLEN, gwĕn′dō-lĕn. Wife of Locrine and daughter-in-law of the legendary King Brutus, according to Geoffrey of Monmouth's *Chronicles*. Through jealous rage, she drowned Sabrina, her husband's illegitimate daughter, in the river Severn.

GUENON, ge-nôn′ (Fr., ape, monkey). A term for a group of African monkeys, forming the large genus Cercopithecus, and including the malbrouak, vervet, grivet, green, patas, mona, diana, and various other species, elsewhere mentioned. All are small, slender, arboreal in habit, gregarious, strikingly colored, and so hardy and docile in captivity that they furnish the most familiar forms to menageries. They are the servants of organ-grinders, and pets on shipboard and in the house all over the world. These are the monkeys best known by the ancients of Egypt, Greece, and Rome, and probably were those designated by the Latin name *Cebus*, now applied to an American group alone. Anatomically they more closely resemble the langurs than any other group.

GUERCINO, gwĕr-chē′nō (It., squint-eyed), a nickname of GIOVANNI FRANCESCO BARBIERI (1591-1666). An Italian painter. He was born at Cento, near Bologna, February 8, 1591, the son of a peasant. There is a difference in opinion as to his first masters at Cento and in Bologna, but they were certainly of the Eclectic School, and it is likely that he was influenced by the works of Lodovico Carracci (q.v.). His earliest works, however, show the influence of Caravaggio (q.v.), whose pictures he certainly saw, and are marked by strong contrasts of light and shade and by the naturalism of that master. In 1616 Guercino founded a popular school of painting at Cento; in 1619 and 1620 he visited Ferrara at Venice, and in 1621-23 he was at Rome. The influence of these travels is seen in the works of his second period, which are his best. His designs became grander, his sense of color more refined, and his heads more characteristic. To this period belong the "Raising of Saint Petronella," in the museum of the Capitol at Rome; his fresco of "Aurora," in the Villa Ludovisi, Rome; and his "Saint William of Aquitaine Assuming the Monk's Garb," in the Gallery of Bologna. Upon the death of his patron, Gregory XV., in 1623, Guercino returned to Cento, where he made his home until 1642. In 1619 he painted the frescoes

of the cupola of the Cathedral of Piacenza—a remarkable technical production, in coloring, foreshortening, and relief. The subjects represented are: "Prophets with Angels," "Sibyls," and "Scenes from the New Testament."

Upon the death of Guido Reni (q.v.) in 1642, Guercino attempted to fill his place at Bologna. He imitated Guido's manner, but without success, losing his own strength and vigor. Most of his pictures in Bologna and several in the Louvre are in this last manner. He died at Bologna, February 22, 1666, leaving a large school. His house at Cento, with its fine paintings and fresco decorations, is still preserved, and the church there also contains several of his works.

Guercino left 250 large pictures, besides frescoes and smaller works, and a number of drawings. Among his chief paintings, besides those mentioned above, are: "Saint Bruno and His Companions in the Desert," in the Gallery of Bologna, and the "Capture of Saint Roch" (1618), a fresco in San Rocco, Bologna; "Saint Peter Raising Tabitha," in the Pitti Palace, Florence; the "Death of Dido," in the Spada Palace, Rome; "Abraham Casting Off Hagar," in the Brera, Milan; the "Prodigal Son," in the Museum of Turin, the last two belonging to his later period; "Cephalos and Procris," at Dresden; the "Ecstasy of Saint Francis," in the Louvre; the "Assumption of the Virgin," at Saint Petersburg. Consult: Calvi, *Notizie della vita di Barbiere* (Bologna, 1842); Malvasia, *Felsina pittrice* (ib., 1678); Dohme, *Kunst und Kunstler Italiens*, vol. iii. (Leipzig, 1887).

GUEREBA, gā-rā'bā (South American name). The black howler monkey. See HOWLER.

GUEREZA, gē-rē'zā (African name). A strikingly adorned monkey (*Colobus guereza*) of eastern Central Africa, found in forests from southern Abyssinia to Mount Kilimanjaro, and westward beyond Lake Albert Nyanza. The head, body, and limbs are covered with black hair of moderate length; but a line of long hair, which hangs below the flanks, rises on both sides of the back and forms a white mantle. The dark face is also surrounded by a white fringe, so that long whiskers lie flat on the cheeks. The long tail terminates in a white tuft. The local variety on Mount Kilimanjaro exhibits these features in their highest perfection, the tail being 'feathered' throughout its whole length with hair described by Abbott as glistening like spun glass. This long black and white fur so closely harmonizes with the moss on the trees that the monkeys are unrecognizable at a very short distance. This species is nowhere very numerous, since it has been persistently sought by the natives for the sake of its skin, with which the Abyssinian soldiers adorned their shields, while the Masai warriors used the white mantle and tail as a part of their battle costume. No specimen has thus far been taken to Europe alive. Consult books of exploration in East Africa, especially those of Thomson, Johnston, Abbott, and Gregory. See KING MONKEY; and Plate of MONKEYS OF THE OLD WORLD.

GUERICKE, gā'rē-ke, OTTO VON (1602-86). A celebrated physicist, known chiefly by his discoveries regarding the nature and effects of air. He was born at Magdeburg, and studied in Germany and Holland, subsequently traveling in England and France, and becoming later an engineer in the army of Gustavus Adolphus. In 1646 he was made Burgomaster of Magdeburg, and became greatly interested in the philosophical discussions over the vacuum which were in progress. The experiments of Galileo and Pascal on the weight of air led Guericke to attempt the creation of a vacuum. His first experiment was made by filling a stout barrel with water and then pumping out the water, but it was found that no sooner was a vacuum produced in the barrel than the air forced its way through. He next took a globe of copper provided with a stop-cock, and having an opening at the bottom, into which a pump was fitted. To his astonishment he found that the pump extracted the air quite as well as the water, and when he opened the cock the air rushed in with a whistling noise. This, the first air-pump, was invented about 1650. (See AIR-PUMP.) Guericke's invention soon became famous, and in 1654 he was summoned to the presence of the Emperor Ferdinand III. of Germany at Ratisbon, at which time he made the famous experiment commonly known as the 'Magdeburg Hemispheres' (q.v.). Guericke's *De Vacuo Spatio*, a work in seven books, written in 1663, was published in 1672, and the third book, which contains an account of his experiments, was translated into German and published in Ostwald's *Klassiker*, No. 59 (Leipzig, 1854). Guericke's name is also associated with the beginnings of scientific investigation in the field of electricity. In his experiments he applied friction to a sphere of sulphur.

GUÉRIN, gā'rān', GEORGES MAURICE DE (1810-39). A French poet. He was born in Languedoc, entered the Church, and became a member of the religious community of La Chesnaye. In 1838 he was appointed an instructor in the Collège Stanislas, Paris. His poems were collected in 1860 as *Reliquiæ*, edited by Trébutien, with a critique by Sainte-Beuve. His genius was exceptional, its most distinctive characteristic being its comprehensive view of nature.—His sister EUGÉNIE (1805-48) was remarkable for her brilliancy, and for her devotion in caring for him. Her *Journals and Letters* (1862) are charming in style, and reveal her saintly spirit. For a most penetrative and sympathetic study of his life and work, consult Matthew Arnold, *Essays in Criticism* (1865). Consult also Harriet Parr, *Maurice and Eugénie de Guérin* (London, 1870).

GUÉRIN, PIERRE NARCISSE, Baron (1774-1833). A French historical painter, born in Paris, May 13, 1774. He was a pupil of Jean Baptiste Regnault (q.v.), and was entirely under the influence of David. His works are good in line, but cold in color and sentiment. The best of them, the "Return of Marcus Sextus" (1799), in the Louvre, is of unusual pathos. Others are: the "Offering to Æsculapius" (1802); "Pyrrhus and Andromache"; "Æneas and Dido" (1813); "Clytemnestra" (1817)—all in the Louvre; and "Napoleon Pardoning the Rebels in Cairo," at Versailles. Guérin was made member of the Institute and of the Order of Saint Michel in 1819; director of the French Academy at Rome in 1822, baron in 1829, and officer of the Legion of Honor in 1832. He died in Rome, July 16, 1833. Among his pupils were Sigallon, Géricault, and Delacroix (q.v.).

GUÉRIN-MENEVILLE, mā'n'-vēl', FÉLIX EDOUARD (1799-1874). A French naturalist.

born at Toulon. A pupil of Cuvier, Geoffroy Saint-Hilaire, and Latreille, he became professor of entomology in the College of France in 1850, and was specially famed for his scientific investigations into the proper methods for raising silkworms. He wrote largely upon the subject for the different societies to which he belonged, and published, besides: *Icomographie du règne animal de Cuvier* (1829); *Genera des insectes* (1835); *Guide de l'éleveur de vers à soie* (1856); *Production de la soie, situation, maladies et amélioration des races du ver à soie* (1857); and *Notes sur les éducations pour graine qu'il conviendrait de faire pour atténuer les désastreux effets de l'épizootie des vers à soie* (1857).

GUERNSEY, gērn'zī. The second in size of the Channel Islands (q.v.), distant 69 miles southeast from Start Point, Devonshire—the nearest point of the English coast, and about 46 miles southwest of Cherbourg, in France (Map: France, D 2). Its length is nine miles, its greatest breadth about five, and its circumference 31 miles. The northern part of the island is flat, the southern more elevated, intersected by deep valleys and glens, and with a lofty, picturesque coast. Saint Peter Port and Saint Sampson, connected by the first-built English electric trolley line, are the chief towns. Saint Sampson is an important quarrying centre for blue granite. There is a United States consular agency on the island. Population, in 1891, 35,289; in 1901, 40,477.

GUERNSEY, Egbert (1823—). An American homeopathic physician, born at Litchfield, Conn. He entered Yale College in 1842, but came to New York and graduated in medicine from New York University in 1846. He then began practice in Williamsburg (now a part of New York City), and was soon appointed city physician. In 1848 he started the Brooklyn *Daily Times*, and was for two years its editor-in-chief. The teaching of Hahnemann was then exciting great interest in this country, and Guernsey became a convert to, and prominent exponent of, the homeopathic system of practice. He began to practice in New York City in 1850, and was identified with the New York Homeopathic Medical College, as professor, first of materia medica, and then of practice. His book on *Domestic Practice* (1855) has passed through several editions, and was translated into French, Spanish, and Danish. In 1852 he edited, with Dr. A. Gerald Hall, *Jahr's Manual*, and in 1872 he established and became the editor-in-chief of the New York *Medical Times*. In 1870 he organized the Western Dispensary, since united with the Hahnemann Hospital. In 1877, through his efforts, the inebriate asylum on Ward's Island, New York City, was converted into a general hospital under the control of the Commissioner of Charities and Correction, and placed in the hands of the Homeopathic Medical School of Practice, Guernsey being its president. Besides the writings mentioned above, Guernsey was the author of an elementary history of the United States, which was used in public schools throughout the country.

GUERNSEY CATTLE. See Cattle.

GUERNSEY LILY. See Amaryllis.

GUÉROULT, gā'rōō', Adolphe (1810-72). A French publicist, born at Radepont (Eure). He became known as an exponent of Saint-Simonist principles, and wrote articles on economic subjects for the *Journal des Débats* and other periodicals. Subsequently he was correspondent of the *Débats* in Italy, in 1842 was appointed French consul at Mazatlan, Mexico, and in 1847 at Jassy, Rumania. He was variously active as a journalist in Paris from 1848 to 1857, when he became editor-in-chief of *La Presse*. In 1859 he founded *L'Opinion Nationale*, which under his direction attained conspicuous influence as the advocate of democratic measures under Imperial rule. From 1863 to 1870 he was a member of the Corps Législatif, in which he acted with the Left Centre, or democratic opposition. After September 4, 1870, he declared for the Republic. His publications include: the *Lettres sur l'Espagne* (1838), originally contributed as a series to the *Débats* during a residence in Spain; *De la question coloniale* (1842); *Etudes de politique et de philosophie religieuse* (1862); *La politique de la Prusse* (1866); *Discours prononcés au Corps législatif* (1866); and *La République en France* (1871).

GUERRARA, gâr-rä'rà. A town of Algeria, in the District of the Beni-Mzab, about 40 miles northeast of Ghardaia (Map: Africa, E 1). It is a commercial meeting-place for the neighboring tribes, and has a large trade in live stock and in manufactured products imported from foreign countries. The population is estimated at 4000 to 5000.

GUERRAZZI, gwĕr-rät'sê, Francesco Domenico (1804-73). An Italian statesman and writer, born at Leghorn, and educated for the legal profession. In 1829 Guerrazzi was associated with Mazzini and Bini in the establishment of the *Indicator Livornese*, a short-lived liberal organ. A little later came his *Elogio di Cosimo del Fante*, and as a result of the liberal opinions enunciated in this treatise he was sent to Montepulciano. There he wrote *La serpicina*, a little essay delightful in style, intended to prove the paradox that man is in every way inferior to the brutes. He was imprisoned in 1831, and again in 1834, when he was taken to Portoferraio. At this place he employed his time in writing his *Assedio di Firenze*, an historical novel, replete with patriotic fervor, which was published at Paris in 1836, and was a favorite with the younger generation during the events prior to 1848. In January of this last year he was again incarcerated for a few months. On the eve of the definite breach between the people and the Grand Duke of Tuscany, in 1849, Guerrazzi was induced to accept office in the Ministry. On the flight of the Grand Duke he was proclaimed member of the Provisional Government, and subsequently Dictator. During this crisis of the State he preserved the strict autonomy of Tuscany until the return of the grand ducal rule, when he was immediately seized and imprisoned on the ground of having neglected due measures of repression when the revolution first gathered strength during his Ministry. His defense, entitled *Apologia della vita politica di F. D. Guerrazzi*, published at Florence (1852), is a masterpiece. After an imprisonment of three years, he was condemned to the galleys, but was subsequently permitted to select Corsica as the refuge of his perpetual banishment. Restored to liberty and action by later events, Guerrazzi sat in the Parliament of Turin in 1862 and 1865. Guerrazzi's vocabulary

is of the purest Italian, but his style is often most bitterly intemperate—Byronic in its impulsiveness, not infrequently bombastic, and occasionally even blasphemous. Some of the novels of Guerrazzi are: *La battaglia di Benevento*, his first important production, and one of the most praiseworthy for its narrative style, not so much marred by defects here as elsewhere; *Veronica Cybo; Isabella Orsini* (1844); *Marchese di Santa Prassede* (1853); *Beatrice Cenci* (1854); *La torre di Nonza* (1857); *Storia di un moscone* (1838); *Pasquale Paoli* (1860), a work excellent in both tone and treatment, and dealing with the fall of Corsica. The later novels, like the *Assedio di Roma* (1864), showed a remarkable decline in power on the part of Guerrazzi. Conspicuous among his other writings are the *Scritti*, published at Florence (1847), containing the mordant satire, *I nuovi Tartufi;* the *Discorso al principe e al popolo* (1847), in which he demanded a constitution for the country; the *Asino* (1857), with a subject like that of *Serpicina;* and the *Vita di Andrea Doria* (1863). In 1844 he collected and published, at Florence, four *Orazioni funebri d'illustri Italiani*, and in 1848 he printed his *Memorie*. Consult: The editions of Guerrazzi's *Lettere*, by Carducci (Leghorn, 1880-83), and by Martini (Turin, 1891); Bosio, *Opere, Vita di Francesco Domenico Guerrazzi* (Milan, 1877); Vismara, *Bibliografia di Francesco Domenico Guerrazzi* (Milan, 1880); Fenini, *Francesco Domenico Guerrazzi, studi critici* (Milan, 1873).

GUERRERO, gâ-rā′rô. One of the Pacific States of Mexico, bounded by the States of Michoacan, Morelos, Mexico, and Puebla on the north, Oaxaca on the east, and the Pacific on the southwest. Its area is 24,996 square miles (Map: Mexico, J 9). With the exception of the coastal zone, about twenty miles wide, where the land rises gently, the surface is rough and mountainous. The Sierra Madre del Sur, rising to an altitude of over 9000 feet, traverses the whole length of the State parallel with the coast. It sends out numerous lateral spurs, inclosing narrow valleys through which small streams run south into the Pacific and north into the Rio de las Balsas, also called Rio Mexcala, the only large river of Guerrero. Its valley, separating the Sierra Madre del Sur from the main range of the Sierras, occupies the northern half of the State. The climate is very hot and unhealthful in the coastlands, where fevers and leprosy prevail to a great extent; but the uplands enjoy a temperate, dry, and healthful climate. There is an extensive region of agricultural land, but its cultivation is greatly impeded by the sparseness of population. The chief agricultural products are cereals, fruits, tobacco, coffee, cacao, vanilla, and cotton. The mineral deposits are believed to be extensive, but thus far relatively little has been done toward their exploitation, although considerable quantities of silver have been mined. There is direct steamship communication between the port of Acapulco and foreign countries. The Interoceanic Railroad, which is to connect Acapulco with Vera Cruz, is still in course of construction, and has been completed as far as Chilpancingo. The population in 1900 was 475,594, largely aboriginal Indians. The largest city is Chilapa, with a population of 12,000; the capital is Chilpancingo, a small town in the centre of the State, situated about 200 miles from the City of Mexico, and about 110 miles from the coast. It is well built and lighted by electricity, and had in 1895 a population of 6321.

GUERRERO, Vicente (1782-1831). A Mexican revolutionary leader. He was born at Tixtla, and spent his youth upon a farm. In October, 1810, he joined the Revolutionary army under Morelos, and distinguished himself by his energy and valor. In 1818, when all opposition to the Spanish power seemed extinct, he won two victories over the Viceregal troops, and reorganized the republican movement. He became the recognized head of the Independents, and established himself in the south, but was induced by Iturbide, in January, 1821, to join in the *Plan de Iguala*, by which Mexico was to become independent under a king of the Spanish royal family. Iturbide's assumption of the Imperial title alienated Guerrero, who became the leader of the opposition, and was in command at the battle of Almolonga, in January, 1823, in which he was severely wounded. When Iturbide left the country, Guerrero was made a member of the Executive Council of four, but his lack of education and his inexperience in politics prevented his exercising much influence in the Government. From 1824 to 1828 he was Vice-President of the Republic. He was a candidate for the Presidency in 1828, and was defeated. Thereupon his partisans rose in revolt, and succeeded in forcing the legally elected candidate (Pedraza) to leave the country. The Congress elected Guerrero to the vacant office (March, 1829). The most important measure of his administration was the decree abolishing slavery (September 15, 1829). The Spanish invasion of that year was repelled with ease, but the extraordinary powers conferred upon the President afforded a pretense for the formation of a revolutionary coalition, under the veteran intriguer Bustamente. Revolution broke out in December, and gained ground with great rapidity. Bustamente assumed the office of President. Guerrero fled to the south, and with Acapulco for a base of operations kept up the defensive until January, 1831, when he was betrayed into the hands of his enemies by a Genoese shipping captain. He was shot on February 14, 1831, after a brief military trial.

GUERRILLAS, gĕr-rīl′lâz (Sp., predatory war, diminutive of *guerra*, war, from OHG. *werra*, strife, confusion). Organizations of troops carrying on warfare independently, and operating principally against isolated detachments or convoys. They were originally partisan armed bands of Spanish peasantry who, favored by local conditions and the terrain generally, proved very effective against the French invasion which began in 1808. In the American Civil War the name was applied to various irregular bodies of Confederate troops. Similarly, the francs-tireurs (q.v.) of the Franco-German War were practically guerrillas. The Spanish employed some few guerrillas against the United States in Cuba in 1898, and the closing stages of the recent British-Boer War were devoted, on the Boer side, to guerrilla tactics, carried out by small bands of armed Boers.

GUERRINI, gwĕr-rē′nê, Olindo (pseudonym, Lorenzo Stecchetti) (1845—). An Italian poet and miscellaneous writer, born at Sant' Alberto (Province of Ravenna). He studied law at the

universities of Turin and Bologna, but never practiced. In 1868 he began to occupy himself with literature and research, and he was appointed librarian of the University Library at Bologna. His publications include: *Postuma. Canzoniere di Lorenzo Stecchetti* (1877); *Polemica* (1878); *Canti popolari romagnoli* (1880); *Rime di tre gentildonne del secolo XVI.* (1882); *Brandelli* (1884); and *Il libro dei colori* (with Ricci, 1887). He is the chief representative of the so-called 'verism' in modern Italian lyric poetry.

GUESCLIN, gâ'klăn', Bertrand du. See Du Guesclin, Bertrand.

GUESS, gĕs, George. See Sequoya.

GUESS WARP. A hawser paid from a ship by rough estimate of its sufficiency. In carrying out a hawser in a boat from a ship to a distant object, if the boat is small, or if in haste, only part of the hawser is put in the boat, which drags the hawser from the ship until, in the judgment of the officer or petty officer in charge of the boat, he can reach his destination with what he has in the boat.

GUEST (in law). See Inn, Innkeeper.

GUEST, gĕst, Edwin (1800-80). An English scholar. He graduated at Cambridge, where he became fellow of Caius College in 1824 and vice-chancellor in 1854. He was one of the founders of the Philological Society (1842), to which he contributed numerous papers. His work in philology has been largely superseded, but his *History of English Rhythms* (2 vols., 1838; ed. by Skeat, 1882) is still valuable. He was a pioneer in the study of ancient Britain. Some of his investigations in the field were collected by W. Stubbs under the title *Origines Celticæ* (1883).

GUEST, John (1821-79). An American naval officer, born in Missouri. He entered the navy in 1837, and in 1866 rose to be captain. During the Mexican War he served along the coast of Mexico, and in 1854, while at Shanghai in command of the seamen and marines of the steamer *Plymouth*, won a decisive victory over a force of Chinese rebels who were seeking to plunder foreign residents. In the Civil War he commanded the *Owasco* in the passage of Forts Jackson and Saint Philip, and the *Lehigh* and *Itasca* in the battles of Fort Fisher. He was promoted in 1873 to be commodore, and was in command of the Portsmouth Navy Yard at the time of his death.

GUEUX, Les, lâ gĕ (Fr., beggars). The name assumed by the confederated nobles who opposed the tyrannical policy of Philip II. of Spain in the Low Countries, and brought about the revolt which separated the Northern Provinces from Spain. Philip having followed up his previous policy of severity and persecution by sending inquisitors to the Low Countries to put into execution the decrees of the Council of Trent, provoked by this act the bitter resentment of the patriotic party, who saw in it an attempt to curtail their ancient liberties. An opposition was thus formed, which, headed by Count Louis of Nassau and Count Hendrik van Brederode, declared in an act called the 'Compromise' (April 5, 1566) their fixed determination to ignore the authority of the inquisitors. On one occasion, after listening to a deputation from the liberal party, the Regent, Margaret of Parma, it is said, seemed inclined to yield to their demands, when one of her council approached her and whispered that she "need not be afraid of these gatherings of beggars." The remark having been overheard by some of the deputation, the epithet was soon afterwards assumed as the title of the patriotic league. The 'beggars' maintained a long and vigorous contest against the despotic proceedings of Philip and his advisers. A branch of them, the 'sea beggars,' under the bold leadership of Count de la Marck, initiated the long struggle for independence by the capture of Briel, April 1, 1572. The record of their struggles is a glorious one. After many reverses and few successes, the tide turned in their favor. From the date of the Union of Ghent (1576) the history of the Gueux is merged in that of the Netherlands. Consult: Kervyn de Lettenhove, *Les huguenots et les gueux* (Brussels, 1883-86); Renon de France, *Histoire des troubles des Pays-Bas* (Brussels, 1889); De la Gravière, "Les gueux de mer," in *Revue des Deux Mondes* (Paris, 1892); also the general works of Motley, Blok, and others, mentioned in the article on the Netherlands.

GUEVARA, gâ-vä'rà, Antonio de (c.1490-1545). A Spanish writer. He was attached to the Court of Isabella I. for a part of his early life, entered the Franciscan Order in 1528, and became Court preacher and historiographer of Charles V. He enjoyed great favor in his own time, both at home and abroad, for the peculiarly artificial style of his didactic and political treatises, which are marked also by decidedly moralizing tendencies. This rhetorical manner of Guevara prevailed in his *Marco Aurelio con el relox de principes* (1529), which, translated into English—*The Golden Book of Marcus Aurelius, Emperor and Eloquent Orator*, translated from the French by Lord Berners (London, 1532); and again, *The Diall of Princes, Englysshed oute of the Frenche*, by Thomas North (London, 1557; cf. a later ed., London, 1619)—first made known in England the literary mannerisms and affectation which in Lyly's hands became euphuism. Like the other productions of Guevara, this work was frequently translated into French, and from it, through an interesting French translation, La Fontaine derived the subject-matter for his fable *Le paysan du Danube* (libre xi., fable 7). When publishing the *Relox*, Guevara pretended that it was a genuine autobiography of Marcús Aurelius, and that the original manuscript was to be found at Florence. This fraud was detected and made known in 1540, by Pedro de Rua, a professor at Soria, and Guevara had to admit his authorship. The proceeding was the occasion of undue strictures upon him on the part of several critics. His other productions comprise a volume (Valladolid, 1539) containing the *Década de las vidus de los V. Césares, emperadóres romanos*, the *De menosprecio de la corte*, the *Aviso de privádos y doctrina de cortesános*, and the *De los inventores del marear*; the *Epístolas familiares* (also published at Valladolid in 1539); and two devout treatises, the *Monte Calvario* (1542) and the *Oratório de religiósos* (1543). Of these the *Epístolas familiares* became the most famous, and were widely read for the sake of their refined diction, which for us is overwrought and absurdly pompous. Among the English translations of the *Epístolas*—called generally the 'Golden Epistles,' so great was their vogue—may be noted

that of E. Hellowes (London, 1574), and that of G. Fenton (1575). Consult: Guevara, "Epístolas familiares y escogidas," in the *Biblioteca clásica española* (Barcelona, 1886); the selections from Guevara given in "Obras escogidas de filósofos," etc., in *Biblioteca de autores españoles* (Madrid, 1873); and for his life, Antonio, in *Biblioteca nova*.

GUEVARA, Luis Vélez de (1570-1644). A Spanish poet and dramatist, born at Ecija, Andalusia. Little is known of his life except that he was Court chamberlain to Philip IV., and a fecund and popular playwright in the style of Lope de Vega. Of his 400 dramas, the names of about 80 remain, and his works have never been collected. The most notable are two tragedies, *Mas pesa el rey que la sangre* and *Reinar despues de morir*, and two comedies, *La luna de la sierra* and *El ollero de Ocaña*. His most remarkable work is *El diablo cojuelo* (1641), a powerful satire, from which Le Sage borrowed much for his *Le diable boiteux*. Other tales by him are printed in the *Colección de novelas escogidas* (1785-94).

GUEVI, gwā'vê (South African name). The pygmy antelope. See Bluebuck.

GUGLIELMI, gōō-lyĕl'mê, Pietro (1727-1804). One of the most celebrated Italian composers of the eighteenth century. He was born at Massa di Carrara, and was educated chiefly by his father, who was *maestro di cappella* in the ducal chapel of Modena. He gained a European reputation as a musician and composer; but after living in Germany and England returned to Italy at the age of fifty to find his operas neglected for those of Cimarosa and Paisiello. Guglielmi immediately set to work and composed a number of new operas which regained for him the public favor. He was appointed *maestro di cappella* at Saint Peter's, Rome, by Pope Pius VI., in 1793, and from that time up to the day of his death occupied himself completely with his official duties. He was the composer of almost twenty operas, many of them extremely popular in their day, several oratorios, and considerable Church music. His death occurred at Rome.

GUIAN, gē'ăn. A town of Samar, Philippines, situated at the southern extremity of the island, about 109 miles southeast of Catbalogan. Population, in 1898, 11,300.

GUIANA, gē-ä'nâ. A territory in the northeast part of South America, bounded by the Atlantic on the north, by Brazil and the Atlantic on the east, and by Brazil and Venezuela on the west (see accompanying map). Its area is estimated at 175,400 square miles. (Brazilian Guiana, lying on the south, is sometimes embraced under this general heading.) Guiana has not been thoroughly explored. Its surface may be described, on the whole, as a plateau rising toward the west and north, with an average elevation of about 3200 feet. The mountains have nowhere been found to rise higher than the peak Roraima (8600 feet). This mountain is on the western boundary, and belongs to the Pacaraima range. Along the southern border of Guiana is the low Tumuc Humac range. The coast is level and low, and dikes keep back the ocean at many points.

Guiana is a well-watered country, numerous rivers coursing through it northward to the sea. The most important of them are the Essequibo (600 miles in length, the longest river in Guiana), Mazaruni, Berbice, Corentyn, and Maroni (400 miles). Owing to numerous rapids and falls, they are navigable only for comparatively short distances. Of the many fertile valleys, none has any considerable extent except the depression lying between the Essequibo and the Corentyn. Little is known of the geology of Guiana, except in the southern part, near the Brazilian boundary, where valuable deposits of gold have given an impetus lately to geological exploration. In this region gneisses and granites are found to underlie heavy beds of sandstone and other stratified rocks of undetermined age.

The climate is tropical. Owing to the intense heat and humidity along the coast, the northern portion of Guiana is particularly unhealthful. Both here and up along the rivers fevers have greatly interfered with the development of the country by Europeans. The climate of the upland interior is naturally more moderate and inviting. The rainy period extends from the last of April until the middle of August, during which time there is a very heavy precipitation. Along the coast there is a second and lighter rainy season from November to February. In the short dry periods of the year east winds prevail. Guiana is free from hurricanes. The vegetation is wholly equatorial. In the lower and northern sections heavy forests cover the land. They usually extend well up toward the higher parts. The forests, like the fauna, are similar to those of the Amazon region, possessing valuable medicinal and dye woods and the typical wild fruits of the torrid zone. The magnificent Victoria regia was first made known from the Berbice River. The plateau itself, so far as explored, is practically barren. The low, forest-covered lands are very fertile, but are surpassed in richness by the tide-irrigated coast strip. The cultivated land produces the usual tropical crops, as well as some of a less torrid region. Among the larger animals may be mentioned the jaguar, sloth, tapir, ant-eaters, capybara, and numerous monkeys (howlers, capuchins, marmosets). The boa, anaconda, and a number of venomous species represent the serpents.

Politically Guiana is divided into three countries—British, Dutch, and French Guiana.

British Guiana. This Colony, a possession of Great Britain, forms the western part of Guiana, and lies between Venezuela and the Corentyn River. Its area is about 95,100 square miles, being more than half that of all Guiana. Of British Guiana (quite the most important of the three Colonies), only the alluvial stretch along the coast has been really developed. There are three settlements—Demerara, Essequibo, and Berbice—with Georgetown as the capital of the Colony. In addition, there is the new northwest district, which began to be opened up in 1883. There were 83,000 acres in the Colony in cultivation in 1900, nearly seven-eighths of which was in sugar. The live-stock interests are not important. Wood-cutting is a leading industry. The gold-mines are being exploited, and employ some 11,000 miners. Diamonds are also found, chiefly along the Mazaruni River.

The principal export is sugar, forming about 55 per cent. of the total exports for the Colony. Next in order of value rank gold (£393,926) and

CARIBBEAN SEA
Punta Gallinas
C. Vela
Cartagena
Barranquilla
Sierra Nevada de Sta. Marta
Maracaibo
Coro
Puerto Cabello
Caracas
Cumana
Barcelona
Carupano
Port of Spain
TRINIDAD
Pt. Baja
Panama
Bay of Panama
Pt. Mala
Punta Solano
C. Corrientes
Medellin
Bogota
Chiquinquira
Bucaramanga
San Jose de Cuenta
Merida
Guanare
Sierra Nevada
Orinoco
Bolivar
Imataca Mts.
VENEZUELA
BOLIVAR
Roraima Mt.
Sa Pacaraima
Sierra Parima
Maparini Duida
COLOMBIA
CUNDINAMARCA
Popayan
Pta. Coco
Pta. Guascama
Pasto
Quito
Cotopaxi
Chimborazo
Guayaquil
Cuenca
ECUADOR
ORIENTE
Iquitos
Thermopylae Pass
Tonantins
Fonteboa
Santo Antonio
Amazon R.
Manaos
Equator
Partly
Ferd. de Lesseps Pk.
Sa. do Curupira
Espiritu Santo
Castanheira
Thomar
Barcellos
Carvoeira
Moura
Ayrão
Tanapecaçu
Silva
Simoes
Coary
Tefe
Tabatinga
AMAZONA
Boa Vista
Madeira
Tapuru
Tirol
Hyutapahan
Quicia
Lahrea
Crato
Huayta
Boa Esperanza
Uneplor
Madeira Falls
Ribeirao Falls
Guajara Falls
Cordilheira Geral
Villa Bella
Rivera Alta
Concepcion
San Lorenzo
Sta. Rosa
Exaltacion
Santa Ana
Trinidad
Loreto
Ascencion
Concepcion
Cazal Vasco
Mataro
Cuatro Ojos
Higuerones
Portachuelo
Santa Cruz de la Sierra
SANTA CRUZ
Milagro
Gutierres
Co. Cortado
Parapiti
Puerto Pacheco & Bahia Negra
San Francisco
CHUQUISACA
Crevaux Military Colony
Santa Victoria
Lavalle
Fort Victoria
Rivadavia
Jujuy
Co. Rincon
ARGENTINA
PARA
BOLIVIA
La Paz
Cochabamba
Oruro
Sucre
Potosi
Tacna
Arequipa
Moquegua
Iquique
Antofagasta
Co. Paniri
Neu Lopez
V. Zapaleri
V. Licancaur
Tropic of Capricorn
PERU
Callao
Lima
Cerro de Pasco
Huaraz
Truxillo
Chiclayo
Cajamarca
Moyobamba
Chachapoyas
Cuzco
Ayacucho
Carabaya Range
Pano
Tarma
Tacora
Sajama
Tupiza
Tarija
Cotagaita
Huanchaca
Yura
Caloha
Uyuni
Tacopilla
Cuchan
Patillos
Laguna
Cerro Gordo
Mollendo
Camana
Arica
Tacna
Pisagua
Tacapilla
Chacamo
Colana
Mejillones
Cerro Gordo
Cerro de Pasco
Huanuco
Huancavelica
Ica
Chorrillos
Mala
Canete
Pisco
Cerro Nasca
Pta. Aguja
Pta. Guascama
C. San Francisco
C. S. Lorenzo
C. Blanco
Parina Pt.
Pt. Burica
Pt. Mariato
Pta. Arena
Pta. Coco
Pta. Guascama
Pta. Aguja
Pt. Mala
Pt. Baja
Roraima Mt.
Sa. do Curupira
Ferd. de Lesseps Pk.
Equator
Tropic of Capricorn
PROVINCES IN ECUADOR
1 Esmeraldas
2 Carchi
3 Imbabura
4 Manabi
5 Pichincha
6 Leon
7 Rios
8 Bolivar
9 Tunguragua
10 Guayas
11 Chimborazo
12 Canar
13 Azuay
14 El Oro
15 Loja
16 Oriente
GALAPAGOS IS.
(To Ecuador)
Equator
ISABELLA

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rum (£300,583). Some timber and woods, balata, and molasses are also shipped out. About 40 per cent. of the sugar goes to Great Britain and the United States. The commerce of British Guiana does not appear to be increasing. The total value of exports for 1900-01 was £2,068,406; of imports, £1,393,529. The latter consist principally of tissues, flour, manures, rice, and machinery. North America supplies the Colony with fish. Fully half the Colony's trade is with Great Britain. In 1900-01 the total tonnage entered and cleared was 709,928 tons. The colonial fleet consists of 48 vessels, with 2793 tons. Georgetown (q.v.) is the chief port; next in commercial importance is New Amsterdam, at the mouth of the Berbice. There are 75 miles of railway, 500 miles of river navigation, 600 miles of telegraph lines, and about 75 post-offices.

The Colony is administered by a Governor appointed by the Crown. The Governor is assisted by an Executive Council and by a Court of Policy, consisting of seven appointed and eight elected representatives. In addition, there is a court made up of six financial representatives, who are also chosen by the registered voters (2400). In 1900-01 the revenues and expenditures of the Colony nearly balanced at a little over £500,000. The colonial debt was £688,400. Besides the twenty-five savings banks, there are two banks with a note circulation. The population in the same year was 294,943, among whom were 2600 Europeans, 105,500 East India coolies, 99,700 negroes, and 3800 Chinese. The Asiatics furnish the labor for the plantations. The common language is English, and English money is ordinarily used. In 1900 there were 212 public schools, attended by 27,500 pupils.

Dutch Guiana, or Surinam. This Colony, belonging to the Netherlands, lies next east of British Guiana, and is bordered on the east by the Maroni River. Its estimated area is 49,800 square miles. Only the sea region is developed, the interior having been little explored. The coast is generally rather swampy. Its inhabited portions are protected and drained by dams and canals, and are nowhere wider than 25 miles. Along the coast are fine mangrove forests. Among the woods exploited by the natives here and farther inland are manioc and several varieties of palms. Agriculture is almost the sole industry of the Europeans, sugar being the principal product. Cacao, bananas, rice, and maize are grown. The coffee and cotton industries have been rapidly dying out since the abolishment of slave labor. There are over 40,000 acres in all crops.

Gold was first discovered in 1876 along the eastern edge of the territory, but the mining of it has been not a little interfered with by the contest over the boundary line. In 1900 the production of gold was $522,000, practically the whole being exported. The total of all exports for the Colony in 1900 was 5,540,000 guilders ($2,216,000); of all imports 6,170,000 guilders ($2,468,000). The colonial fleet consists of 464 ships with 280,113 registered tons. The trade is with the United States, Great Britain, and (chiefly) Holland. There are no railways and only a few miles of telegraph lines.

The Colony has a Crown Governor, with a council of four members nominated by the Queen. The Colonial Assembly, or 'States,' consists of four representatives named by the Governor, together with one representative elected for every two hundred electors. There are 16 districts for administrative purposes. The laws are those of the Netherlands. In 1901 the colonial revenues were 2,324,000 guilders ($929,000); the expenditures, 2,705,000 guilders ($1,082,000); subvention from the mother country, 381,000 guilders ($152,400). The official language is Dutch, but English is much used. The population in 1899 numbered 82,300, of whom 12,000 were Indians and Bush negroes, and 1200 were Israelites. The population for the most part belong to the Moravian and the Reformed Lutheran churches. The natives are of little service for industrial purposes except as workers in the forests. In 1899 there were 53 common schools, with 7200 children in attendance. The high schools numbered three. Paramaribo (q.v.) is the capital and only important town.

French Guiana, or Cayenne. This Colony and penal settlement of France lies between Dutch Guiana and Brazil, the River Oyapok being on the eastern border. Its area is estimated at 30,500 square miles. The surface rises quite gradually from the unhealthful coast to the mountain border on the south, where the highest point, however, does not reach above 2700 feet. The coast is not so low as that of British and Dutch Guiana. There are several rivers, but none of importance. Only a small part of the country is known. Fevers, particularly yellow fever, decimate the region, and proved so fatal to French convicts that white prisoners have long been sent elsewhere. Less than 10,000 acres of land are under cultivation. Cacao, coffee, cotton, tobacco, and many other crops grow. Cacao also flourishes wild. The industrial growth of the Colony is very slow and discouraging. The cultivated land is poorly handled and by about only 6000 hands. There are but a few thousand head of live-stock in the Colony.

Gold-mining is the leading industry, and gold is the chief article of export. Gold was discovered in 1853. The value of its annual export has fluctuated considerably. In 1900 the total mined product of the metal was $1,412,000. The development of this industry is much affected by the high rate of mortality. There is a little production of phosphate, silver, and iron. Some marble and balata and rosewood oil also figure in the list of exports. In 1900 the imports were 9,760,000 francs; the export of native products, 6,350,000 francs. Nearly all the trade is with France. In the Colony's commerce of 1899 were engaged 180 ships, of 38,872 registered tons. There are no railways. A cable connects Cayenne with France.

The Colony is administered by a Governor appointed at Paris. He has a Privy Council of seven members. The Colony has sixteen representatives in its Council General, and sends one Deputy to the National Chamber. The Colony is comparatively a heavy financial drain on the Republic, requiring, in 1902, 7,086,000 francs—mostly for the penal establishment. In 1901 the local budget balanced at about $550,000. In 1895 there were 30,310 inhabitants, among whom were 4360 hard-labor convicts and 1500 native Indians. The convicts are restricted to four localities. The Ile du Diable off the coast, northwest of Cayenne, became famous through the imprisonment there of Alfred Dreyfus. Cayenne, the capital (q.v.), and the only important town, has one college. The group of islands called the Iles du

Salut (of which the Ile du Diable, mentioned on preceding page, is one) form a desirable harbor. There are 27 elementary schools, with 2000 scholars.

HISTORY. The coast of Guiana was first visited in 1499 and 1500 by Ojeda, Vespucci, and Pinzon. The Spaniards planted a few settlements in the region, none of which seem to have had any long existence. Missionaries visited the interior during the sixteenth century. The tales of El Dorado aroused interest in this corner of South America, but the main current of settlement and exploration was along the Orinoco and to the westward of modern Guiana. Ralegh, who first made the name widely known, in 1595, confined his operations almost entirely to the river, although his sailing masters in 1594 and succeeding years carefully explored the coast to the east. After the formation of the Dutch West India Company in 1621, the Dutch, who had settled on the Pomerun River as early as 1581, and had explored the Guiana coast more fully in 1597 and 1598, gained a permanent foothold at the head of the Essequibo delta, where a settlement had been existing since 1613. In 1648 the Treaty of Westphalia confirmed the Dutch West India Company in possession of the territory. Meanwhile the French had settled near Cape Orange, and the English near the mouth of the Surinam. In 1667 this English colony was exchanged with Holland for New Netherlands or New York. Things remained in much the same condition until 1803, when England captured Demerara, Berbice, and Essequibo from the Dutch, who formally surrendered them by treaty in 1814. The three colonies, comprising some 76,000 square miles, were consolidated in 1831. The boundary between British Guiana and Venezuela (q.v.) ceased to be a subject of dispute after the arbitration treaty of 1897.

BIBLIOGRAPHY. Martin, *British Colonies* (London, 1849-51); Dalton, *History of British Guiana* (London, 1854); Duff, *British Guiana* (Glasgow, 1866); Palgrave, *Dutch Guiana* (London, 1876); Bronkhurst, *Colony of British Guiana and Laboring Population* (ib., 1883); Rodway, *A Handbook of British Guiana* (Georgetown, 1893); id., *History of British Guiana* (3 vols., Georgetown, 1891-94); *Le Pays-Bas: La colonie Surinam* (Amsterdam, 1898), and the Dutch statistical works, published annually by the Government; Norman, *Colonial France* (London, 1886); Viala, *Les trois Guyanes* (Montpellier, 1893); Bassières, *Notice sur la Guyane* (Paris, 1900); Brousseau, *Les richesses de la Guyane française* (ib., 1901).

GUIANGA, gē-än′gȧ, **GUANGA**, gōō-än′gȧ. A wild Malayan people in Dávao Province, Mindanao; speech separate. Compare Dulangan, Manguanga, Mangulanga. See PHILIPPINES.

GUIB, gwīb (African name). One of the 'harnessed' antelopes, or bushbucks (*Tragelaphus scriptus*), of Southeastern Africa, which formerly were extremely numerous, and are still scattered from Abyssinia to the Cape. It is the smallest of the genus, not larger than a goat in size, and shows a great variety of coloration, which varies from dark brown to pale rufous, irregularly streaked and spotted with white. It keeps near the watercourses, hiding in dense thickets. See Plate of GAZELLES.

GUIBERT DE NOGENT, gē′bâr′ de nō′zhäṅ′ (1053-c.1124). A French historian and theologian, born near Clermont (Oise). He is said to have been instructed by Saint Anselm, and became Abbot of Notre Dame de Nogent in 1104. His principal work is the history of the first Crusade, written probably from 1095-1101, called the best of contemporary accounts. He also wrote an autobiography and several other works. A complete edition of these was issued in 1651.

GUIBERT, gē′bâr′, or WIBERT, vē′bērt, OF RAVENNA (c.1020-1100). Antipope with the name Clement III., 1080-1099. He was born between 1020 and 1030, and in 1073 became Archbishop of Ravenna. He quarreled with Gregory VII. (q.v.), by whom he was suspended in 1075 and excommunicated in 1078. In 1080 the Emperor Henry IV. (q.v.) had him chosen Pope in opposition to Gregory at Bixe, and he was enthroned at Rome four years later, after the Emperor had captured the city. After the death of Gregory Guibert contested the Papal See with Victor III. and Urban II. In 1099 he made his submission to Paschal II.

GUICCIARDINI, gwē′chär-dē′nē, FRANCESCO (1483-1540). An Italian statesman and historian, born of noble parentage at Florence. The studies of law and literature engrossed his earliest attention, and before he reached the age of twenty-three he was elected professor of law by the signoria of Florence. His knowledge of international law and his tact in the conduct of public affairs caused him to be selected in 1512 by the signoria as Ambassador to the Court of Ferdinand, King of Aragon. During a period of two years he discharged his diplomatic duties with ability. In 1515 he was dispatched by the Republic of Florence to receive at Cortona Pope Leo X. This pontiff at once secured Guicciardini's services, and committed to him the government of Modena and Reggio, and finally of Parma. Under Clement VII. he was for some years governor of the Romagna, and finally of Bologna. On the accession of Paul III. (1534), Guicciardini resigned all his dignities, and returned to Florence, where Alexander de' Medici had been made sovereign by Charles V. On the assassination of Alexander, Guicciardini promoted materially the elevation of Cosimo de' Medici; but meeting with no special favor from that prince, he withdrew from Florence to his villa at Arcetri, where he commenced his famous work *La storia d'Italia*, the greatest historical work of the sixteenth century. He died before its completion. In 1561, twenty-one years after his death, the first sixteen books of his history were published at Florence, and three years later, at Venice, four additional books appeared. The work is considered a standard of classical historical writing, independently of its value as a minute and faithful record of the period it embraces, from 1490 to 1534. A magnificent Italian edition was published at Freiburg (1775-76), and another at Pisa in 1819, edited by Rosini. An earlier work than the *Storia d'Italia* was the *Storia fiorentina*, composed about 1509, and dealing with the history of Florence from 1378 to 1509; it is marked by an impartial and keenly searching spirit. In 1857-67 there appeared at Florence *Opere inedite di Francesco Guicciardini*, comprising: *Considerazioni intorno ai discorsi del Machiavelli, Ricordi politici e civili—Discorsi politici* (vol. i.); *Del reggimento di Firenze, Discorsi intorno alle mutazioni e riforme del governo fiorentino* (vol. ii.); *Storia fiorentina* (vol. iii.); *Lettere e*

istruzioni scritte durante la luogotenenza generale per il Papa Clemente VII. (vols. iv., v.); *Carteggio, 1512-34* (vols. vi.-ix.); *Ricordi autobiografici e di famiglia, scritti vari* (vol. x.).

Consult: Benoist, *Guichardin, historien et homme d'etat* (Paris, 1862); Gioda, *Guicciardini e le sue opere inedite* (Bologna, 1880); Rossi, *Francesco Guicciardini e il governo fiorentino dal 1527 al 1540* (Bologna, 1896); Zanoni, *Vita pubblica di Francesco Guicciardini* (Bologna, 1890).

GUICCIOLI, gwē-chō'lē, TERESA, Countess (1801-73). The daughter of Count Gamba of Ravenna; married when sixteen to Count Guiccioli, who was over sixty. She is known to fame from her intimacy with Lord Byron in 1819-22. In 1851 she married the Marquis de Boissy. She wrote a defense of Byron, entitled *Lord Byron jugé par les témoins de sa vie* (1868), known in its English translation as *My Recollections of Lord Byron* (1869).

GUICHARD, gē'shär', KARL THEOPHILUS, better known as QUINTUS ICILIUS (1724-75). A German soldier and writer on military affairs, born in Magdeburg. As an ensign (1747) he took part in the War of the Austrian Succession in the Netherlands, and in 1752 he was mustered out with the rank of captain. In 1758 he published his *Mémoires militaires sur les Grecs et les Romains.* At the outbreak of the Seven Years' War he enlisted in the army of Duke Ferdinand of Brunswick, and in 1758 was presented to Frederick the Great, to whose personal service he was forthwith attached. It was at Landshut in May, 1759, that Frederick referred to a certain centurion mentioned in Polybius's account of the battle of Pharsalus as Quintus Icilius. Guichard ventured that the name was Quintus Cæcilius, persevered in his correction, and next day appeared with the text of Polybius in confirmation. "So?" retorted the King. "Well, then, Quintus Icilius shall be *your* name!" From that time Guichard appeared as Quintus Icilius in all lists and reports. He became major in 1758, and after the conclusion of the war was retained at Potsdam, where he was promoted to be colonel. He published further, *Mémoires critiques et historiques sur plusieurs points d'antiquités militaires* (1773). Consult Carlyle, *History of Frederick the Great* (London, 1858-65).

GUICHE, gēsh, DIANE D'ANDOUINS, Countess of (1554-1620). A mistress of Henry IV. of France; daughter of Paul d'Andouins. In 1567 she married Philibert de Gramont, Count of Guiche. About 1580 Montaigne dedicated some sonnets to her, and about that date the *belle Corisande,* as she was called, met the King, who wished to marry her after her husband's death at La Fère (1580). Henry's letters to her are included in his published correspondence, *Recueil des lettres missives de Henri IV.* (9 vols., 1843-76).

GUIDE (OF. *guis,* Fr. *guide,* from OF. *guier, guider,* Fr. *guider,* to guide, probably from Goth., AS. *witan,* OHG. *wizzan,* Ger. *wissen,* to know, Lat. *videre,* to see, Gk. *εἰδέναι, eidenai,* Skt. *vid,* to know). A military term denoting the noncommissioned officer detailed to regulate the pace and direction of bodies of troops during parade, drill or evolutions. It also describes the person, civil or military, intrusted with the responsibility or duty of leading troops through a strange country, or during night operations. In the French Army the Guide Corps of cavalry and infantry form an important branch. The corps of guides of the British Indian Punjab frontier force consists of six troops of cavalry and eight companies of infantry, composed of native rank and file, and also, with the exception of fourteen Europeans, of native commissioned officers. The French Guide Corps was first formed in 1744 as a small company of messengers on active service, but the number increased rapidly, until Napoleon finally formed them into a corps ten thousand strong.

GUIDERIUS, gwī-dē'rī-ŭs. A long-lost son of Cymbeline, in Shakespeare's romantic comedy of that name. Stolen, together with his brother, by the exiled Morgan when a child, he dwells with them in the forests of ancient Britain and receives into his cave his lost and unrecognized sister. He is restored to his princely rank and surroundings in the dénouement.

GUIDGUID, gwid'gwid, or **GUITGUIT.** An imitative name given in tropical America to almost any small bird having a quickly repeated cry, especially the creepers of the genera Cœreba, Dacnis, and the like. It is also used of members of the family Pteroptochidæ, which consists of many species of small, plainly colored, wren-like birds which spend their time and seek their insect food on the ground in the forest. A Chilean species (*Hyactes megapodius*) is very well known as 'eltureo.'

GUIDI, gwē'dē, CARLO ALESSANDRO (1650-1712). An Italian poet, born at Pavia. Literature, especially poetry, engrossed his earliest attention, and to the ability of his first pieces he owed the notice of the Duke of Parma, whose favor he further secured by the talent he evinced in setting his verses to airs of his own composition. In 1685, with the sanction of the Duke, he went to Rome, where his patron assigned him apartments in the Farnese Palace. He obtained the friendship of Christina, Queen of Sweden, and composed, at her request and with her collaboration, the pastoral drama of *Endimione;* he was also one of the first members of the Arcadia. He died at Frascati. The dramas of Guidi fail in sweetness and affection, but are interesting and elevated in sentiment. As a lyrical poet Guidi ranks very high; to him is due a modification of the canzone by the introduction into it of free strophes. He was at first under the influence of Marinism, but he later adopted the classical manner of Chiabrera and Testi. His *Rime* appeared first at Parma in 1681. Consult: Martelli, in *Vite degli Arcadi,* vol. iii. (Rome, 1714); Crescimbeni, in the *Poesie di A. Guidi, non più raccolte* (Verona, 1726).

GUIDI, TOMMASO. See MASACCIO.

GUIDICCIONI, gwē'dē-chō'nē, GIOVANNI (1500-41). An Italian poet, born at Lucca. He was made Bishop of Fossombrone, and afterwards president of the Romagna and governor of the Marches. His love poems are of little value, but where his strong feeling for his country is shown, as in the sonnet beginning "The Arne, and the Tiber, and the Po," his verse is very noble. His complete works were published in 1718, and his *Lettere inedite* in 1865.

GUIDO, gwē'dō. Duke of Spoleto. He contested the Italian crown with Berengar I. (q.v.),

with the result that he was crowned King at Pavia (889). In 891 the Pope placed the Imperial crown on his head. Guido died in 894.

GUIDO. In Ariosto's *Orlando Furioso,* an ally of the Amazons under Marphisa, and the husband of ten wives of that nation, whom he had been forced to marry after being wrecked on their coasts. He is surnamed 'the Savage,' and is a doughty champion.

GUIDO D'AREZZO, dä-rĕt'sô, or **GUIDO ARETINO** (c.995-c.1050). A famous reformer of music, and a monk of the Benedictine Order. Nothing is known absolutely of his life, the only source of information being the frequently contradictory traditions of the Middle Ages. He has the reputation of being the inventor of musical notation, and has been styled 'The Regenerator of Music.' But the circumstances which led to this invention are differently stated by nearly every narrator. The most plausible and possibly the most reliable account is that on one occasion, while chanting with the monastery choir a hymn in honor of Saint John, he was struck with the gradual and regularly ascending tones of the opening syllable sounds of each hemistich in the first three verses:

"*Ut* queant laxis	*Re*-sonare fibris
Mi-ra gestorum	*Fa*-muli tuorum
Sol-ve polluti	*La*-bii reatum," etc.

Comprehending the fitness of these sounds to his proposed system of solfeggio, he promptly systematized the idea. The fame of Guido's musical invention, and the success he achieved with it, particularly among the youthful choristers of his own monastery, while it gained for him considerable ill-will, and subjected him to much jealousy in his own and neighboring monasteries, finally brought him to the attention of the Pope (John XIX.), who invited him to Rome. Guido immediately accepted the invitation, and met with a very gratifying reception. The Pope became a student of the new system and did much to help the cause.

Research and tradition are united in ascribing to him the introduction of the four-line staff, which was a combination of the former red *f* line and yellow *c* line, with the addition of a black *a* line between them, and a black *e* line above them; the mensural notes being written on the lines and spaces. Extra lines were added either above or below, whenever necessary. By this invention a uniformity of pitch was obtained, which in itself marks one of the most important steps in the history of music. Ill health compelled Guido to leave Rome, and he reëntered the Monastery of Pomposa, where he had spent his younger days. He left many interesting writings explanatory of his musical doctrines, among which may be mentioned the *Microlologus* and the *Argumentum Navi Cantus Inveniendi.* See MUSICAL NOTATION.

GUIDO DELLE COLONNE, dĕl'lâ kô-lŏn'nâ. An Italian poet of the thirteenth century, probably a Sicilian by birth. He wrote Italian poems patterned after Provençal models, and in Latin a *Historia Trojana,* based on Dictys and Dares, and on the twelfth-century *Roman de Troie* of the French trouveur Benoit de Sainte Maure. This poem was very popular in the Middle Ages, and, translated into nearly all the tongues of Western Europe, had a great effect on the literature of Italy, France, and England. Caxton's English version of the French translation by Raoul de Fevre was the first printed English book.

GUIDO GUINICELLI, gwē'nē-chĕl'lē. An Italian poet. See GUINICELLI, GUIDO.

GUIDON, gī'don (older form *guydon,* from Fr. *guidon,* from *guider,* to guide). A color or pennon carried by troops of cavalry or batteries of field or horse artillery, broad at one end and forked at the other. It aids in maintaining alignments, being placed on the flank on which the guide is indicated. In column formations it is placed at the head of the columns. See COLORS, MILITARY.

GUIDON DE LA MER, gē'dôn' de lâ mâr (Fr., banner of the sea). A celebrated treatise on maritime law, which appeared at Rouen about the year 1671. Notwithstanding the fact that it was of unknown authorship, it rapidly gained a position of great authority, comparable to that of the *Consolato del Mare* (q.v.), and the *Ordonnance de la Marine* (q.v.), promulgated by Louis XIV. of France in 1681. See also MARITIME LAW; OLÉRON, LAWS OF; RHODES, LAW OF; WISBY, LAWS OF. The best edition is that contained in Pardessus, *Collection de Lois maritimes antérieures au XVIIIe siècle* (Paris, 1828-45).

GUIDONIAN (gwē-dō'nĭ-*an*) **HAND.** A mechanical device for teaching the syllables of solmization (q.v.). Guido of Arezzo distributed the twenty tones of his scale over the finger-tips and joints of the left hand. But as the hand has only nineteen tips and joints, the twentieth tone (which was very seldom used) was assigned to a point above the tip of the middle finger. After the position of the different tones on the hand was once committed to memory, the pupil was enabled to tell any interval or scale by merely glancing at his left hand.

GUIDO (gwē'dô) **OF LUSIGNAN,** lụ'zē'-nyän'. See GUY OF LUSIGNAN.

GUIDO OF SIENA, sē-ā'nâ. A painter of the thirteenth century, about whose work there is much uncertainty. He is important mainly as an immediate predecessor of Cimabue and Giotto, and was slightly superior to his contemporaries, such as Margaritone and the Berlinghieri, and the equal of Giunta Pisano. For the Church of San Domenico, in Siena, he executed a large painting of the "Virgin and Child Enthroned," with six angels, signed and dated 1221 (though the date is read by some 1271 or 1281, on account of spaces between the existing numerals). In the general treatment of the picture there is nothing to distinguish it from other works of the same early period; but the heads of the Virgin and Child are indisputably superior, in natural character and graceful dignity, to anything anterior to Cimabue. It is now conceded that the heads were repainted in the fourteenth century; thus the claims of Cimabue would remain undisturbed. Beyond this, little is known of Guido of Siena. There is in the Academy of Siena a picture assigned to him, a half figure of the Virgin and Child, with two angels; also in the Church of San Bernardino, in the same city, a Madonna, dated 1262. Milanesi thinks that the work in San Domenico is due to Guido Graziani, of whom no other records remain earlier than 1278, when he was mentioned as the painter of a banner.

GUIDO RENI, rā'nē. An Italian painter of the Bolognese School. See RENI, GUIDO.

GUIENNE, gē′ĕn′. An ancient province of France. It comprised the territory now included in the departments of Gironde, Lot, Lot-et-Garonne, Dordogne, Aveyron, and portions of Tarn-et-Garonne and Landes, and formed with Gascony what was originally Aquitania, of which name Guienne is a corruption. For its earlier history, see AQUITANIA.

GUIGNES, gē′ny′, JOSEPH DE (1721-1800). A noted French Orientalist and Chinese scholar. He was born at Pontoise in the Department of Seine-et-Oise. His great work, *L'histoire générale des Huns, Turcs, Mongoles, et autres Tartares occidentaux avant et depuis J. C. jusqu'à présent* (1756-58), is a rare specimen of industry and research. De Guignes maintained the thesis that the Chinese were the descendants of a very ancient Egyptian colony. His son, CHRÉTIEN LOUIS JOSEPH (1759-1845), also a very distinguished Oriental scholar, was consul at Canton and published a Chinese dictionary (1813).

GUIGNIAUT, gē′nyō′, JOSEPH DANIEL (1794-1876). A French Hellenist and archæologist, born at Paray-le-Monial. He was appointed director of the Normal School in 1830, afterwards was made professor of Greek, and then professor of geography in the faculty (1835). In 1860 he was made perpetual secretary of the Academy of Inscriptions. His principal work, *Religions d'antiquité considérées principalement dans leur formes symboliques et mythologiques* (1825-51), is founded upon the *Symbolik* of F. Creuzer. Other works include: *Dissertation sur la Vénus de Paphos* (1827); *Dissertation sur le dieu Serapis et son origine* (1838); and *Théogonie d'Hésiode* (1835). He also contributed articles on archæology to the *Globe*, the *Revue Archéologique*, and other publications.

GUIGNOL, gē′nyōl′. A French puppet show, the equivalent of the English *Punch and Judy*. It was developed from the Italian *pupazzi* by Laurent Mourgnet, who in 1795 established a theatre for the Guignol in Lyons, which was kept up for many years by his descendants. The drama is said to be derived from Guignol or Chignol, a silk-weaver of Lyons, where, as also in Paris, the performance is one of the most popular street shows. See PUNCH.

GUIJA, gē′hä. A lake of Central America, situated in the republics of Salvador and Guatemala, at an altitude of over 3000 feet (Map: Central America, C 3). It is about 20 miles long and about 6 miles wide, and is surrounded by mountains. It contains two volcanic islets.

GUIKOWAR, gī′ko-wär. See GAEKWAR.

GUILBERT, gēl′bâr′, YVETTE (1868—). A Parisian singer, noted for her performances at cafés-concerts, like the Eldorado and the Ambassadeurs, and such theatres as the Nouveautés and the Variétés. She visited the United States in the season of 1895-96, and again in 1896-97, and also appeared with some success in Germany and England. In 1897 she became Madame Schiller.

GUILD (AS. *gegild, gildscipe*, Icel. *gildi*, Ger. *Gilde*, guild, from AS. *gild*, Icel. *gjald*, payment, OHG. *geld*, Ger. *Geld*, money, from AS. *gildan*, Icel. *gjalda*, OHG. *geltan*, Ger. *gelten*, to pay, Eng. *yield*). A mediæval association whose members were pledged to assist each other in the pursuit of common ends. They have been classified as (1) ecclesiastical, (2) social-religious, and (3) trade guilds. The trade guilds may be subdivided into the guild merchant and the craft guilds. The aim of the ecclesiastical guilds was to promote piety and encourage good works; while the aim of the social-religious guilds was to perform certain social and religious functions, such as the holding of feasts, psalm-singing, and escorting the dead to the grave. These guilds also endeavored to secure protection for members from personal injury. The trade guilds were mainly designed to protect the economic interests of their members, but social and religious functions were also performed by them.

ORIGIN OF GUILDS. The origin of the guilds is still a matter of dispute. They first became prominent after the ninth century, when the original tribal organization of the Teutonic races had broken down, and in some cases succeeded to the functions of the tribe. The spread of Christianity had a great influence upon their development. It is possible that on the Continent the trade corporations of the Roman Empire had not wholly disappeared, and formed the nucleus of some of the later guilds.

Guilds are first mentioned in the Carolingian capitularies of A.D. 779. The first authentic notice of guilds in England dates from the ninth century. These early guilds were social-religious in their nature. In England evidence of trade guilds does not appear before the Norman Conquest, when the great increase in trade made associations for mutual protection necessary. They had probably appeared somewhat earlier in Flanders and North France.

SOCIAL-RELIGIOUS AND ECCLESIASTICAL GUILDS. The history and organization of the social-religious guilds are involved in much obscurity. They were presumably local organizations. In some cases they became powerful, and were vested with manorial jurisdiction. In England they lost their importance after the Norman Conquest. The ecclesiastical or religious guilds, on the other hand, grew in wealth and power down to the beginning of modern times. In London there were a large number of them. In the reign of Richard II. a guild in honor of Saint George the Martyr, consisting of an alderman, master, brothers, and sisters, was established in Norwich. King Henry V. confirmed it by letters patent under the great seal, made it perpetual, and granted it certain privileges and immunities (Madox, *Firma Burgi*). In like manner guilds were formed in Bristol, Exeter, and other large towns. These guilds, through the munificence of individuals, by degrees amassed considerable wealth. By Henry VIII. the property and revenues of these religious guilds were seized and perpetually vested in the Crown. See BROTHERHOODS, RELIGIOUS.

THE GUILD MERCHANT. In its early stages the guild merchant was doubtless a private institution, designed solely to protect the interests of its members. By the twelfth century it had become in England and in some Continental cities a semi-public body, possessing by charter a monopoly of all trade carried on within the town. Those who were not of the guild might, indeed, sell their wares, but not at retail. They were, moreover, subjected to all sorts of petty exactions from which guild members were exempt. Entrance to the guild merchant was free to all burgesses who would share in the 'scot and lot'—the general

burden of taxation. Citizens of distant towns might be given the privileges of the guild. (See LAW MERCHANT.) This was, however, less generally the case on the Continent. In Continental countries the guild merchant never attained the influence that it attained in England. In many cities it remained practically a private institution parallel with the craft guilds.

THE CRAFT GUILDS. With the growth of industry the members of different trades began to associate themselves for the defense of their own special interests. These associations were known as the craft guilds in England, as the *corporations de métiers* in France, and the *Zünfte* or *Innungen* in Germany. In England we may regard them as the outgrowth of the guild merchant. Supervision in the various trades, regulations as to membership, and like functions were consigned to these guilds. Members might still belong to the guild merchant. As one craft after another was organized, the guild merchant lost its functions as a regulator of trade, and finally lost its individuality, becoming an integral part of the municipal constitution.

In their inception the craft guilds admitted to their ranks all who could exercise their trades with sufficient skill. They sought to insure good workmanship, and therefore required that each craftsman should have served an apprenticeship. Officials of the guild supervised the entire process of production, to see that no deception was practiced. Night work was for this reason forbidden, In so far, therefore, the interests of the consumer were protected. They sought to protect their own interests by preventing all competition, both from without and within. Non-members were not permitted to practice the trade within the towns; and the members were required to sell at the same rates, and to pay equal prices for raw materials. During the flourishing period of their existence (from the twelfth to the fifteenth century) the craft guilds did much to advance the standard of workmanship and to procure a satisfactory existence for their members.

The membership of the guilds consisted in master-workmen, journeymen, and apprentices. The master workman alone bought materials and sold the finished product; the journeymen lived in the master's household, and received a fixed wage for their work. The apprentices also lived with the master, but as a rule they received for their labor nothing but their board and training. In the period of greatest prosperity each apprentice looked forward to becoming a journeyman, and each journeyman could become a master. In France and Germany, and less generally in England, it was the custom in some trades for each craftsman who had completed his apprenticeship to travel from place to place, learning new methods of work. It was also customary to require from the journeyman who wished to become a master the performance of a piece of work as evidence of his capacity—a *chef d'œuvre*, or masterpiece. These customs obviously exerted a very beneficial influence upon mediæval industry.

Prominent examples of the trade guild in England were the weavers' and goldsmiths' guilds. The weavers' guild was the earliest and most important of the craft guilds. Weaving was the first important industry to break away from the house system, hence the early development of the guild. In 1130 we find mention of an influential weavers' guild in London, Lincoln, and Oxford. At the height of its powers the guild claimed full jurisdiction over its members in pleas of debt, contract, and petty agreements. It held a monopoly of the cloth industry and regulated the quality and prices of the goods produced. Later it split into several branches, of which one, the drapers, became an association of great importance, developing into the merchant class which later won for England her commercial supremacy. In the fifteenth century the influence of the weavers' guild was broken by the introduction of the domestic system of industry in the cloth trade, under which the craftsman, originally an independent worker owning his own tools and purchasing his own materials, became a mere wage-earner. The guild continued to exist until the eighteenth century, but without vitality or influence.

The earliest mention of a goldsmiths' guild dates from 1180. At that time the guild was 'adulterine,' i.e. unauthorized by the Crown. Later, however, the goldsmiths constituted one of the more powerful guilds of London, and are regularly mentioned near the head of the list of the 'twelve great companies.' By a statute of 1300 the guild received the office of establishing a standard of fineness for gold and silver used in the arts. The standard was established in London, and officers of the guild were to visit other cities, establishing in each place the London standard. Throughout the Middle Ages the goldsmiths' guild seems to have played an important part in determining the standards adopted in the coinage. At the beginning of modern times we find the goldsmiths a wealthy and powerful body, who undertook, in addition to the work of their craft, the functions of deposit and lending of money.

In England the craft guilds did not generally aim at political power. On the Continent, on the other hand, prolonged struggles were carried on between the guilds and the aristocracy. In some parts of Germany the contest for political power culminated in civil war. During a part of the thirteenth and fourteenth centuries the guilds succeeded in securing political supremacy in some of the cities of Germany.

JOURNEYMAN GUILDS, COMPAGNONNAGE. The movement of population to the towns, which characterized the later Middle Ages, created in the guilds a tendency toward exclusiveness. The period of apprenticeship was lengthened for those who were not the children of guild members, and certain classes were excluded from membership altogether. The period of journeying from place to place was also lengthened, and the fees for admission to the guilds were increased. The 'masterpiece' became a very onerous and costly piece of work, sometimes requiring several months of labor and heavy expenditures for materials. The chance of the journeyman's becoming a master workman was accordingly greatly reduced. A cleft appeared between the interests of the master and those of the journeymen. The latter associated themselves in the so-called journeyman or yeoman guilds of England and the *compagnonnage* of France. These organizations sought to secure better wages from the masters, and to assist members in distress. The *compagnonnage* in particular developed into a powerful organization. Its members were bound by oaths to carry out the policies of the organization. The masters naturally opposed it in every

way, as did also the clergy and the State. It continued, however, to thrive. In 1791 it was formally proscribed by the Revolutionary Government; but it was beyond the reach of the police power. During the nineteenth century, however, its significance dwindled away. Only vestiges of it remain at present.

Decline of the Guilds. The guilds were strictly local institutions, working for a local market, and their monopoly was a local monopoly. The commercial progress which followed the era of discovery reacted upon the industrial organization. It offered a wider market than had heretofore been known, and encouraged production upon a large scale, to which the guild system was inherently antagonistic. It was necessary that either the guilds should abandon their policy of exclusiveness and restriction, or that industry should be transferred to new centres, where guild regulations had no force. In England these things occurred. In some of the older towns great inroads were made in the industrial privileges of the organized masters. Where custom and tradition stubbornly resisted such innovations, towns gradually sank in importance. On the other hand, in the north of England, even before the utilization of coal in modern production, new towns and industrial centres arose where the guilds had no sway. On the Continent of Europe the system lost its vigor in the latter half of the eighteenth and first half of the nineteenth century, owing to the general development of modern industry.

Guilds, Musical. With the decline of the troubadours and the passing of music from the aristocratic minnesingers to the civic meistersingers, a corresponding change took place in the attitude of the general public toward musicians. Instead of being fêted and praised they were now looked upon as mere hirelings, whose morals were doubtful, and who deserved little consideration and no civil privileges. In self-defense, therefore, the minstrels, jongleurs, and itinerant musicians banded themselves together into guilds. These organizations, which differed little from the commercial guilds, were recognized by the King or by the local authorities, and the members admitted to certain privileges within the territory governed by their guild. Although the guilds of different countries had certain distinguishing features, the general plan was the same, the authority being vested in a king or warden, and a board of control, who arbitrated any disputes between the members. The first musical guild of which we have record was the 'Nikolaibrüderschaft,' which was organized in 1288. Soon after the musicians of Strassburg founded the 'Bruderschaft der Kronen,' and about the same time the famous 'Confréries de Saint Julien des Ménétriers' came into prominence in Paris. This latter guild acquired wide influence, even requiring all music-teachers and organists to belong to it, and was abolished only in 1773. In England the 'Musician's Company of the City of London' was formed in 1472, and incorporated by James I. in 1604 as the 'Worshipful Company of Musicians.' The regulations and privileges of this guild are representative of the general character of musical guilds. It was given exclusive rights. "All musicians and dancing-masters playing for hire in the City of London are obliged to take up their freedom thereof in the Company of Musicians only." As every musician had to pay £1 12s. to the company for the freedom of the city, and as binding an apprentice cost £1 10s. 2d., it will be seen how the Worshipful Company quickly acquired considerable power. Every member was further obliged to take an oath swearing loyalty to the King and city, and promising to be "obedient unto the Master and Wardens of the Art or Science of Musicians of London, for the time being, in all things concerning the same Art and Science." Instrument-makers fared badly in the Middle Ages. For the most part they were compelled to join nearly allied guilds, but in France and Belgium a number of separate instrument-makers' societies were formed. The most important of these was the "Corporation des joueurs, faiseurs d'instruments de musique et maîtres de danse," established in 1454 at Rouen. See Hanseatic League. Consult: Gross, *Gild Merchant* (Oxford, 1890); Seligman, *Mediæval Guilds* (Baltimore, 1887); Saint Martin, *Histoire des corporations de métiers* (Paris, 1897); and *Le compagnonnage* (Paris, 1901).

GUILD, Curtis (1827—). An American journalist, born in Boston. He began a mercantile career, but in 1847 became a reporter for the Boston *Daily Journal*. Two years later he became connected with the *Traveler*, of which he became part owner in 1856. In 1859 he founded and became editor of the Boston *Daily Commercial Bulletin*. His publications include: *Over the Ocean* (1867); *Abroad Again* (1873); *Britons and Muscovites* (1888); *A Chat About Celebrities;* and *From Sunrise to Sunset*, a volume of poems.

GUILD, Reuben Albridge (1822-99). An American author and librarian. He was born in West Dearborn, Mass., and was educated at Brown University, where, after graduating in 1847, he was appointed librarian, a position which he held until 1893. His publications include: *The Librarian's Manual: A Treatise on Bibliography* (1858); *Life, Times, and Correspondence of James Manning, and the Early History of Brown University* (1864); *History of Brown University* (1867); *Biographical Introduction to the Writings of Roger Williams* (1866); *Chaplain Smith and the Baptists* (1885). He edited Staples's *Rhode Island in the Continental Congress, 1765-90* (1870); *Literary and Theological Addresses of Alva Woods* (1868); *Letter of John Cotton, and Roger Williams's Reply* (1866).

GUILDENSTERN, gĭl'den-stērn. A courtier in Shakespeare's *Hamlet*, who always appears with his fellow courtier, Rosencrantz. They are companions of Hamlet, and are set by the King to watch him.

GUILDFORD, gĭl'fērd. The county-town of Surrey, England, situated on the river Wey, 30 miles southwest of London (Map: England, F 5). Grain, celebrated as Surrey wheats, is its staple commodity; fairs are held for horses, cattle, pigs, and sheep; it has breweries, iron-foundries, brick-fields, paper and powder mills, and is an important railway centre. The town consists mainly of one long wide street with many well-built and many old and picturesque houses. The prominent buildings are: the Norman keep of the ruined castle which stands in a public park; the Archbishop Abbot's hospital (1619); Trinity and Saint Mary's churches; the

guildhall, corn market, county hospital, institute, and free grammar school founded by Edward VI. Guildford is a suffragan bishopric to Winchester. The town owns its markets and water-supply. Guildford was bequeathed in the will of Alfred the Great to his nephew Ethelwald, and was a royal demesne and occasional regal residence until 1630. Population, in 1891, 14,800; in 1901, 16,000.

GUILDHALL. An important public building in London, which may be regarded as the town hall, and is the place of assembly of several courts, as the court of common council, the court of aldermen, the chamberlain's court, and a police court presided over by one of the aldermen. The construction of the building was begun in 1411. It was partially destroyed in the great fire of 1666, but was soon restored, and in 1789 it was altered to its present form. The hall proper is 153 feet in length, 48 in breadth, and 55 in height. It has been famous for centuries for the magnificence of its civic feasts. The first time it was used for this purpose was in 1500, when Sir John Shaw, goldsmith, who had been knighted on the field of Bosworth, first gave here the Lord Mayor's feast.

GUILD OF ARQUEBUSIERS, är'kwē-bŭs-ērz'. A painting by Jan van Ravesteyn, representing twenty-five arquebusiers descending the stairs of a shooting gallery after practice. It now hangs in the town hall of The Hague.

GUILFORD, gĭl'fērd. A borough in a town of the same name, New Haven County, Conn., 16 miles east of New Haven; on Long Island Sound and on the New York, New Haven and Hartford Railroad (Map: Connecticut, E 4). It has a circulating library; and an old stone house, built in 1639, now serves as a State museum. The borough is engaged in agriculture, is the seat of a considerable canning industry, and has a distillery of witch-hazel, and manufactures of iron, wheels, etc. Population, in 1900, 1512.

Settled as Menunkatuck, in 1639, by a company from England under the Rev. Henry Whitfield, Guilford received its present name and became part of the New Haven Colony in 1643. The borough was incorporated in 1818, and in 1826 the town was divided, Madison being set off as a separate township. There is a tradition, apparently well authenticated, that the regicides Goffe and Whalley came to Guilford in 1660 to surrender to William Leete, a native of Guilford, then Governor of the New Haven Colony, and that they were carefully secreted for several days and nights in the Governor's cellar. Guilford was the birthplace and the home for many years of the poet Fitz-Greene Halleck. Consult R. D. Smith, *History of Guilford* (Albany, 1877), and an article in the *New England Magazine*, new series, vol. i. (Boston, 1884).

GUILFORD, Earl of. See North, Lord.

GUILFORD COLLEGE. A town (incorporated in 1895) in Guilford County, N. C., six miles west of Greensboro; on a branch of the Southern Railway (Map: North Carolina, C 1). It is the seat of Guilford College (Friends), established in 1837.

GUILFORD COURT HOUSE. Formerly a small village in Guilford County, N. C., five miles northwest of Greensboro (Map: North Carolina, C 1). A battle lasting five hours was fought here, March 15, 1781, between 4404 Americans under Greene and 2213 English under Cornwallis, the former losing 400 and the latter 600 in dead, wounded, and prisoners. Though neither side gained a decisive advantage, the battle has been regarded as a great strategic victory for Greene, as it closed a campaign in which Cornwallis was outgeneraled and forced to abandon the Carolinas. The site of the battle has been converted into a park, highly improved, and a number of monuments have been placed here.

GUILLAUME, gē'yōm', Eugène (1822-1905). A French sculptor. He was born at Montbard (Côte-d'Or), July 4, 1822, and entered the Ecole des Beaux-Arts in 1841. He won the Prix de Rome in 1845, and a first medal in the Salon of 1855. His first important work, and that on which his reputation chiefly rests, is the splendid group of the Gracchi in the Luxembourg, two half-length figures in bronze. Other works in the same style are the "Roman Marriage" (1877), two statues of Napoleon as lieutenant of artillery and as Emperor, and the monument of the architect Duban. Guillaume modeled busts of Ingres, Balbard, Buloz, Sequin, Jules Ferry, President Grévy, Monsignor Darboy, and others, including six busts of Napoleon. His ideal figures are less fortunate; the best known of these is the group of "Music" on the façade of the new Opera House.

In his personality and in his work Guillaume was scholarly, dignified, and severe. He received medals of honor at the Expositions of 1867 and 1878, was a member of the Institute, and was professor at the Ecole des Beaux-Arts from 1865 to 1875 and also a director of that institution. He was also a prominent lecturer and writer on the fine arts. His article on Michelangelo as sculptor, in the Michelangelo volume of the *Gazette des Beaux-Arts* (1876), is one of the finest appreciations of that great master ever written. Consult Gonse, *Sculpture française* (Paris, 1895).

GUILLAUME DE CHAMPEAUX, de shäN'-pō' (c.1070-1121). A French scholastic, born at Champeaux. He was a pupil of Anselme de Laon in Paris, and afterwards opened a school himself in connection with the Cathedral of Notre Dame. Here one of his scholars was his great rival, Abélard. Jealous, it is said, of the younger man's brilliancy, Champeaux removed to a suburb of Paris, where he founded the Abbey of Saint Victor (1113). At this time he was made Bishop of Châlons-sur-Marne. In the controversy regarding investiture he took the part of Calixtus II., and was his representative at the conference of Mousson. He stood for realism as against the nominalism of Abélard, but in a less positive and more scientific form than that of his old master, Anselme. Only three of his treatises have been printed, and these among the works of Saint Bernard. He has been called 'the first dialectician' of the realist sect. Consult: Haureau, *De la philosophie scholastique* (Paris, 1850); and Michaud, *Guillaume de Champeaux et les écoles de Paris au XIIème siècle* (ib. 1867).

GUILLAUME DE LORRIS, lō'rēs' (c.1215-c.1240). A French mediæval poet, born at Lorris. Of the man himself nothing is known, except that he was the author of the *Roman de la Rose* (q.v.). Four thousand of the twenty-two thousand lines in the poem are his, and the sudden

break is presumed to have been caused by his early death. The *Roman* was completed by Jean de Meun about 1277, but in a very different style. Guillaume's part in it has been called "a complete mediæval art of love."

GUILLAUME DE MACHAULT, or **MACHAUT**, mȧ'shō' (c.1290-1377). A French poet and musician, born near Machault, in Champagne. He was secretary to John of Luxemburg, King of Bohemia. In this capacity he accompanied the King in his various expeditions, and remained with him until his death, at the battle of Crécy (1346). When John the Good ascended the throne of France, he gave Guillaume the office of Royal Notary (1350). Meanwhile he had held different ecclesiastical positions. His musical compositions consist of motets, ballads, and rondeaux for several voices, and a mass, which was sung at the coronation of Charles V. (1364). The manuscript of this is in the National Library, Paris. Of his numerous poems, one describes the instruments of music used in those days. Among the others are: *Le comfort d'ami* (1356); *La prise d'Alexandrie*, the history of Pierre I. of Lusignan, King of Cyprus; and *Le livre du voir-dit*. Consult: Tarbé, *Les œuvres de Guillaume de Machaut* (Paris, 1849); and Paulin Paris, *Le livre du voir-dit de Guillaume de Machaut* (ib., 1875).

GUILLAUME DE PALERNE, de pȧ'lärn'. An old French romance, of which the translation has been printed by the Early English Text Society under the title of *William of Palerne*. It is founded on the werewolf superstition. Consult Saintsbury, *A Short History of French Literature* (New York, 1882).

GUILLAUMET, gē'yō'mȧ', Gustave Achille (1840-87). A French landscape and genre painter, born in Paris. He studied under Picot and Barrias, and won the second Prix de Rome in 1863. Soon afterwards he went to Biskra (Algeria), and began the series of Moorish scenes by which he became known. The first of these, "Evening Prayer in the Desert" (1863), is in the Luxembourg. The somewhat melancholy and mysterious character of his Eastern pictures is in striking contrast to the brilliant, sparkling treatment by Fromentin of the same subjects. His other works include: "Laghouat," "The Seguia Ravine, near Biskra," both in the Luxembourg; "Arab Market in the Plain of Tokria;" "The Famine;" "The Dogs of Douar." He also contributed to the *Nouvelle Revue* articles afterwards collected and published with the title, *Tableaux algériens* (1880), an interesting literary comment on his own work.

GUILLEMEAU, gēl'mō', Jacques (1550-1613). A French surgeon, born at Orleans. He studied medicine at the Hôtel Dieu in Paris, served for several years in the army, and in 1595 became provost of the College of Surgeons, Paris. He was the author of several treatises of considerable value and authority, such as: *Traité des maladies de l'œil* (1585); *De la grossesse et de l'accouchement des femmes* (1621); *Œuvres de chirurgie* (1602); *La chirurgie française* (1594).

GUILLEMET, gēl'mȧ', Jean Baptiste Antoine (1842—). A French landscape painter, born at Chantilly. He studied under Corot and Oudinot, and first exhibited in 1865. His landscapes are usually of the country about Normandy or near Paris, treated in simple direct style and quiet color. Examples of his work are: "Low Tide at Villerville," in the museum of Grenoble; "View of Bercy," in the Luxembourg; and a "View of Paris," also bought by the French Government. He received second-class medals at the Salon of 1874, and the Paris Exposition in 1889, and the Legion of Honor in 1880.

GUILLEMIN, gēl'măn', Amédée Victor (1826-93). A French scientific writer, born at Pierre, Saône-et-Loire. He was educated in Paris, and became a teacher of mathematics. He is best known as the author of many popular books on scientific subjects, such as: *Les mondes, causeries astronomiques* (1861); *Simple explication des chemins de fer* (1862); *Le ciel* (1864); *La lune* (1865); *Eléments de cosmographie* (1866); *Les phénomènes de la physique* (1867); *Les applications de la physique aux sciences* (1873); *La vapeur* (1873); *Les comètes* (1874); *La lumière et les couleurs* (1875); *Le son* (1876); *Les étoiles* (1877); *Les nébuleuses* (1880); *Le monde physique* (1880-85); and *Petite encyclopédie populaire* (1886-91).

GUILLEMIN, Jacques Antoine (1796-1842). A French botanist, born at Pouilly-sur-Saône, Côte-d'Or. He was educated at Dijon and Geneva, and went afterwards to Paris, where he was at first a private tutor, then assistant in the museum, then professor of botany at the horticultural institute (1830-34). Four years afterwards he was sent to investigate the tea plantations of Brazil to determine if the plant could not be grown in France, and returned with a large number of specimens, though the greater part of them were spoiled in transit. He contributed articles to the botanical archives and to various learned societies, made also an official report of his trip to Rio Janeiro and published besides: *Recherches sur le pollen* (1825); *Icones Lithographicæ Plantarum Australiæ Rariorum Decades Duæ* (1832); and *Considerations sur l'amertume des végétaux* (1832).

GUILLEMOT, gīl'ē-mot (Fr. *guillemot*, from Bret. *gwelan*, Welsh *gwylan*, Corn. *gullan*, gull + OF. *moette*, Fr. *mouette*, dialectic Fr. *mauwe*, from OHG. *meh*, Icel. *mar*, Dutch *meeuw*, Ger. *Mowe*, AS. *maew*, Eng. *mew*). Any auk (q.v.) of the genera Cepphus and Uria; specifically, the common or 'foolish' guillemot (*Uria troile*). These auks are extremely abundant in the Arctic regions and the colder parts of the temperate zone, particularly in the neighborhood of rocky coasts, the winter migrations extending as far south as the Mediterranean. It is called foolish guillemot from its often suffering itself to be taken by the hand rather than leave the cliffs on which it breeds, where numbers may be seen stationed close together on the ledges of rock. It lays only one egg, which has an exceedingly thick shell, is pear-shaped, and remarkably large, being more than three inches long. This egg exhibits remarkable variety in coloring. No nest is made, but the brooding bird places its webbed toes beneath the egg when incubating, and warms it beneath and between its thighs. The skin, with the feathers, is used for clothing in some northern regions. Young birds and eggs are among the objects in pursuit of which the rock-fowlers of the northern coasts scale or descend terrifying precipices. Great numbers of the eggs are exported from

the coasts of Newfoundland and Labrador. In the North Pacific the common guillemot is replaced by a subspecies of *Uria troile*, called *Californica*. The thick-billed guillemot or 'arrie' (*Uria lomvia*) has the same distribution in the

GUILLEMOTS.
A group on a breeding-ledge, illustrating characteristic attitudes.

New World as the common guillemot, and the Pacific coast form is called 'arra.' It is a somewhat larger bird than the other, and has a bill much shorter and thicker. The black guillemot (*Cepphus grylle*) is a smaller species, about 14 inches long; the plumage is entirely black in summer, except a large white patch on each wing, but in winter the under parts are white. The young are mottled or spotted. It is plentiful throughout the Arctic regions, and has been called 'Greenland dove.' It lays three eggs, often on the bare rock; but if the situation is damp it piles up for them a curious nest of pebbles. On the Pacific coast it is replaced by two similar species, the pigeon guillemot (*Cepphus columba*) and the sooty guillemot (*Cepphus carbo*).

GUILLIM, gwĭl'ĭm, JOHN (c.1565-1621). An English heraldic official, native of Herefordshire. He was educated at Oxford, but for the greater part of his life was red cross herald in ordinary at the London College of Arms. He was credited with the authorship of *The Display of Heraldry* (1610, reprinted 1724), but in reality simply edited Dean Barkham's collections.

GUILLON, gē'yŏn', ADOLPHE IRÉNÉE (1829—). A French painter, born in Paris. He studied with Jules Noël and Charles Gleyre and devoted himself chiefly to the delineation of the landscapes about Vézelay, Yonne, where he lived. He exhibited at the Salon: "La récolte des oliviers à Menton" (1864); "Tamaris et laurier-roses au bord de la Méditerranée (1866); "Pins parasols à Cannes," and "Clair de lune à Cannes" (1867); "La terrasse de l'ancienne abbaye de Vézelay" (1870); "La toilette des canards au bord de la Cure" (1876); "Octobre à Vézelay" (at the Universal Exposition of 1878); "Août" (1882); "Les noyers de la Cordelle" (1883); "Vézelay" (1885); "Menton il y a vingt ans" (1887); "Le barrage du Grand-Moulin" (1888); "Une nuit d'hiver à Cannes," and "Sous les noyers" (1890). He gained medals in 1867, 1880, and 1889.

GUILLOTIN, gē'yō'tăn'. JOSEPH IGNACE (1738-1814). A French physician, born at Saintes. He was a brilliant student, and after obtaining his education in a Jesuit college he entered the Order as a novitiate, and for several years was a teacher in their college at Bordeaux. Afterwards he removed to Paris, where he practiced medicine with such success as to win recognition as one of the foremost physicians of the day. He took a prominent part in the early revolutionary movement, and his suggestion that some kind of decapitating machine be used in inflicting the death penalty forever connected his name with the most terrible events of the French Revolution. He was secretary of the National Assembly in 1790, after which he retired and took no part in the Reign of Terror, during the latter part of which, indeed, he was himself a prisoner and in constant danger of being guillotined. After the rise of Napoleon he resumed his practice in Paris, where he was one of the earliest and most earnest champions of vaccination.

GUILLOTINE, gĭl'lō-tēn'. The instrument of decapitation introduced during the French Revolution by the Convention, and named after its supposed inventor, Joseph Ignace Guillotin, a physician, who, however, was merely the person who first proposed the adoption of a decapitating machine. It is composed of two upright posts, grooved on the inside, and connected at the top by a cross-beam. In these grooves a sharp iron blade, placed obliquely, descends by its own weight on the neck of the victim, who is bound to a board laid below. The invention of machines of this kind is ascribed to the Persians. In Italy, from the thirteenth century, it was the privilege of the nobles to be put to death by a machine of this kind, which was called *mannaia*. An instrument resembling the guillotine was likewise employed in Germany during the Middle Ages. During the sixteenth, and till late in the seventeenth century, a machine called the maiden, which differed but slightly from the guillotine, was employed in Scotland for the purpose of decapitation. That such an apparatus was known and used in France at an earlier period is proved by the execution of the Duc de Montmorency, who is described as having been executed by a falling axe at Toulouse in 1632. The Dutch, too, in the eighteenth century, employed a decapitating machine in executing slaves in their colonies. Consult Le Nôtre, *La guillotine pendant la révolution* (Paris, 1893).

GUILMANT, gēl'măn'. FÉLIX ALEXANDRE (1837—). A French organ virtuoso and composer. He was born at Boulogne and received his earliest instruction from his father, who was a professional musician. He later studied the organ with Lemmens and harmony with Carulli. From early boyhood he was distinguished for his love of music, and the persistent sincerity of his studies, which enabled him when but twelve years old to act as his father's substitute at the organ of the Church of Saint Nicholas. Four years later (1853) he was appointed organist at the Church of Saint Joseph. Other appointments were: 1857, choir-master of Saint Nicholas; 1871, La Trinité; 1893, Chevalier of the Legion of Honor; and 1896, professor of

the organ at the Paris Conservatory. He was the foremost exponent of the distinctively French school of organ music; and on that account, as well as for his brilliancy as an organist, met with great success in his tours of England, Italy, Russia, and the United States. His playing was marked by the striking orchestral qualities of his combinations, a feature which is similarly conspicuous in his compositions. His published works include the lyric scena for soli, chorus, and orchestra, *Belsazar;* a symphony for organ and orchestra; several organ sonatas; and many smaller pieces for organ, one of the most successful of which is the *Marche funèbre et chant séraphique.* His vocal compositions include motets, masses, and choruses.

GUILT, Guilty (AS. *gylt, gilt,* from AS., Goth. *gildan,* OHG. *geltan,* Ger. *gelten,* Eng. *yield*). In law, guilt signifies the fact, whether an overt act or a state of mind, which renders a person liable to punishment for crime. In general, the commission of a forbidden act in itself constitutes legal guilt, but there are other acts, innocent in themselves, which become criminal when performed with a guilty intent. (See Crime; Infant.) In the common-law system, a person accused of crime is presumed to be innocent until his guilt has been established by the verdict of a jury. In England and America there are only two general verdicts which can be given in criminal cases—viz. 'guilty' or 'not guilty'; but in Scotland there is an intermediate verdict, called 'not proven,' which, though in reality a verdict of 'not guilty' (and it is so entered in England), yet is allowed to be given by juries when they are not satisfied that sufficient legal evidence has been given, but nevertheless consider there was some foundation for the charge, or at least some ground for suspicion. It has been objected to this verdict that it leaves a stigma on the party against whom it is found; but it is, nevertheless, firmly intrenched in the law and practice of Scotland.

A person charged with crime is said to have a 'guilty mind' when he has sufficient mental capacity to understand the action and quality of the criminal act in question. Even though he has such capacity, if the act were done under extreme *duress* (q.v.), the actor would not display a 'guilty mind.' For the effect of the plea of 'guilty' or 'not guilty,' in criminal actions, see General Issue; Plea.

GUIMARÃES, gē'mȧ-rīnsh'. A town in the Portuguese Province of Entre-Minho-e-Douro, situated in a valley surrounded by hills, about 35 miles by rail northeast of Oporto (Map: Portugal, A 2). It is a picturesque place, with a number of old buildings and the ruins of the old castle, in which Affonso Henriques, the first King of Portugal, was born. Among other interesting buildings are the Dominican convent and the Church of São Miguel, dating from the eleventh century. In the vicinity of the town are situated hot sulphurous springs, known to the Romans as *Aquæ Lævæ.* Population, in 1890, 8636; in 1900, 8863.

GUIMBAHANO, gēm'bȧ-ä'nō, Guimbajano, Guimbano, Guimba, or Quimpano. A wild Malayan people in Sulu Island. See Philippines.

GUIMBAL, gēm-bäl'. A seaport town of Panay, Philippines, in the Province of Iloilo, situated about 18 miles east of Iloilo (Map: Philippine Islands, G 9). Population, in 1898, 10,960.

GUINAANE, gē-nä'an, Guinan, Ginan, Quinaan. A head-hunting Malay people in Northern Luzon; speech distinct. See Philippines.

GUINART, gē-närt', Roque. A noble in Cervantes's *Don Quixote.* A caricature of a real personage, Don Pedro Rocha Guinarda, leader of a band of freebooters of Catalonia.

GUINEA, gin'ē. A geographical term formerly designating the Western African coast region between the Senegal River on the north and the Orange River on the south, and now being gradually restricted to Portuguese Guinea (adjoining Senegambia) and Angola (qq.v.) (Map: Africa, C 3). The region extending from Sierra Leone to the Gabun River in French Congo was generally termed Upper Guinea, and the region south Lower Guinea. The term Northern Guinea was sometimes applied to the coast of what is now Nigeria and Kamerun. The four Guinea islands were Fernando Po, Annobon, Principe, and São Thomé. The earliest form of the word began to appear on maps in the middle of the fourteenth century. The Portuguese were the first to explore and trade along the Guinea coast, tempted by the gold deposits, and later also by the opportunities of slave-trading. The coast, besides having an almost deadly climate, is generally hard of access from the sea, owing to a rough surf and lack of good havens.

GUINEA. A gold coin formerly current in Great Britain, but now no longer coined. It derived its name from the fact that the gold from which the first specimens were coined was brought from the Guinea Coast in West Africa. For the same reason it originally bore the impression of an elephant. It was first coined during the reign of Charles II. in 1664, and continued in common use till 1817, when it was superseded by the sovereign (q.v.). Its value varied considerably at different periods, but was ultimately fixed at twenty-one shillings. It is still customary in Great Britain to estimate professional fees, honoraria of all kinds, complimentary subscriptions, prices of pictures, etc., in guineas.

GUINEA, Gulf of. That portion of the Atlantic Ocean which washes the western coast of Africa between Cape Palmas at the southeastern point of Liberia and Cape Lopez in about 1° south latitude (Map: Africa, D 4). It forms two open bays, known as the Bight of Benin and that of Biafra.

GUINEA, Portuguese. See Portuguese Guinea.

GUINEA CORN. A name sometimes given to durra, sometimes to another cereal grass, *Pennisetum typhoideum* or *Pennisetum spicatum,* properly called pearl millet, which is very extensively cultivated in Central Africa, and to some extent also in India, where it is called *bajree.* Pearl millet is of the tribe Paniceæ, and is regarded as one of the millets. It is an annual which grows to a height of 8 to 10 feet, with spikes a foot long, which bear a large amount of grain. In India it is one of the most important cereals. As a fodder plant pearl millet ranks high, although rather difficult to cure perfectly. It has been successfully grown in the United States as far north as Pennsylvania. A number of other spe-

cies of Pennisetum are cultivated for their ornamental appearance. See SORGHUM, section *Sorghum, Non-saccharine.*

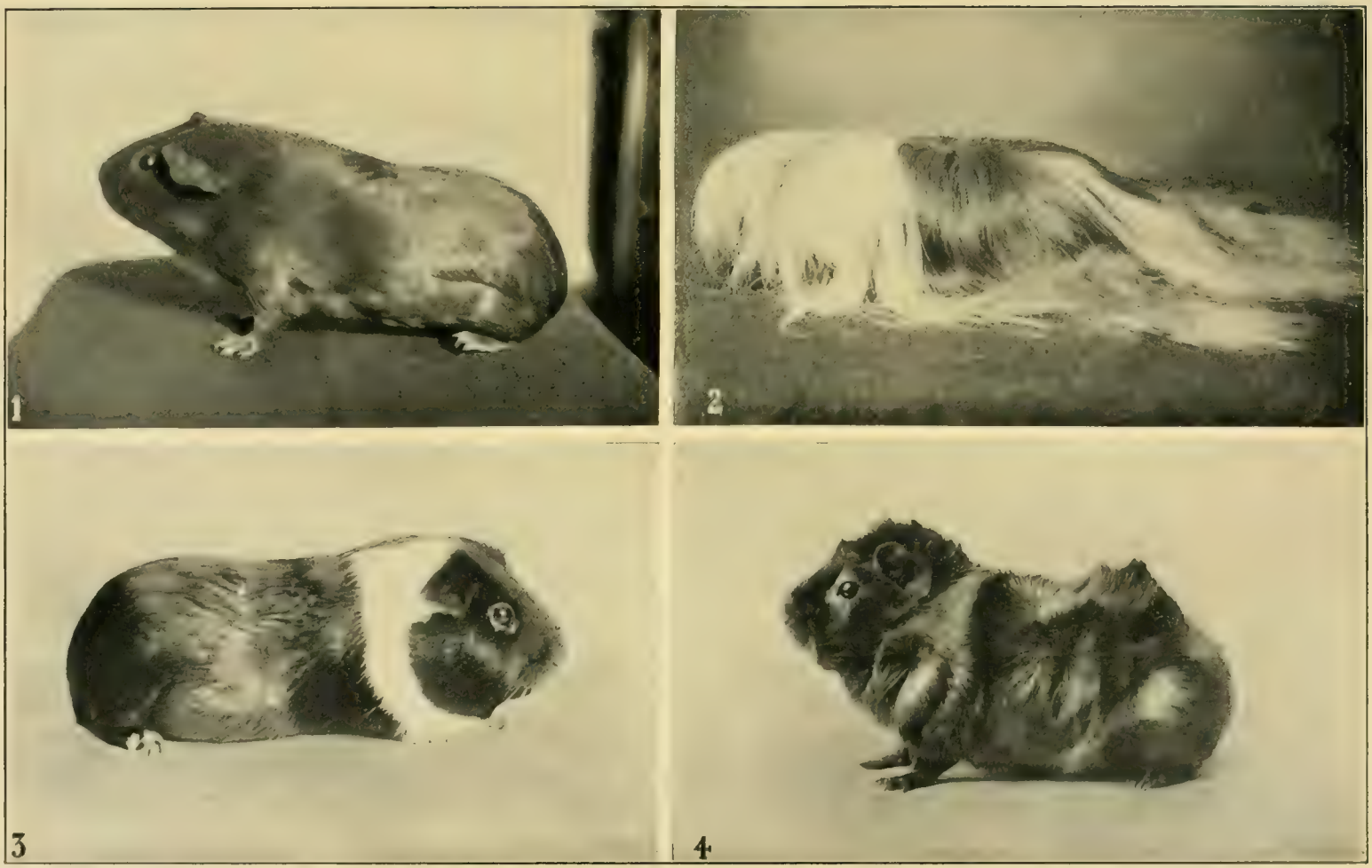
GUINEA-FOWL. A group of birds, closely allied to the peacock, representing the pheasant family on the continent of Africa, and in part domesticated. The guinea-fowls are usually regarded as a subfamily (Numidinæ), and are separated into several genera, including a dozen species, all natives of Africa and Madagascar. They stand between the pheasants and the turkeys and jungle-fowls. Nearest the typical pheasants in structure (from which the subfamily differs in having the skin of the head more or less bare and wattled, in the absence of spurs, and in the fact that the plumage of the sexes is alike) are the crested guinea-fowls of the genus Guttera. They have a jet-black plumage, dotted with small bluish-white or light-green spots, the bare skin of the neck blue, purplish, or scarlet, and the head crowned by a long, full black crest. There is also a ruff about the neck. This genus (or at any rate its best-known species, *Guttera cristata*, of the West African coast) possesses a unique structure in the fact that the head of its wish-bone (the furcula), unlike that in all other Gallinæ, is in the form of a hollow cup which opens upward, into which the trachea, or windpipe, dips and emerges again. Another group contains the 'helmeted' guinea-fowls, of which the 'common' species (*Numida meleagris*) is the type, the top of whose head is covered with a horny cap or 'casque' rising into a hard crest; the bare skin on the sides of the face, neck, and chin, as well as the wattles, are red, and the remainder of the neck is bluish and bristly. The plumage is black, thickly sprinkled with round white spots, to which the bird is said to owe its specific name, given to it by the Romans in fanciful allusion to the tears shed by the sisters of Meleager when he died. Its native home is West-Central Africa. Representing the group in South Africa are *Numida coronata*, a favorite game-bird in Cape Colony, and *Numida cornuta*, more prevalent northeastward. Madagascar has a red-crowned species (*Numida mitrata*), now acclimatized and wild in Rodriguez, and Abyssinia a well-known form (*Numida ptilorhyncha*), without any red on the head, as have all the others, and regarded by Darwin (*Animals and Plants Under Domestication*, 1875) as the source of our domestic races. The *Numida vulturina* of Zanzibar differs from all these, and is the finest of the species. Its plumage is dark blue, it has hackles on the lower part of its neck, and a long tail. Some writers believe this species forms a separate genus, Acryllium. Two other allied birds, essentially differing from the type by the possession of spurs on the feet, are the rare black guinea-fowl (*Phasidus niger*) and the turkey guinea-fowl (*Agelastes meleagrides*), both of the coast of equatorial West Africa, and little known. All these agree in going about in large and noisy flocks, seeking their food on the ground, but roosting in trees. They are polygamous as a rule, make nests on the ground, and lay many eggs. They furnish good sport, and their flesh is excellent.

DOMESTIC RACES. Our domestic guinea-fowls are no doubt derived in the main from the *Numida meleagris* above described, and were among the fowls kept by both Greeks and Romans, who also may have domesticated the Abyssinian species. This fowl disappeared, however, with the decay of Roman civilization, and was reintroduced into Europe, apparently by the Portuguese explorers of Africa, in the sixteenth century. To them we owe the substitution of the name 'guinea-fowl' for the ancient 'meleagris,' which became mixed up with the turkey, whose present names are thus doubly erroneous. It was early introduced into the Cape Verde Islands, and also into several of the West Indies, where it soon ran wild. It slowly became common in Europe, and thence has spread around the world, but has undergone little change beyond a tendency to albinism. These fowls are not popular, however, on account of their almost incessant and harsh cries, and because they are quarrelsome and difficult to rear; but the high price commanded in the market by both the birds and their eggs compensates those who keep guinea-fowls for profit. The eggs are small, and have a thick, strong shell, but are particularly esteemed. See PHEASANT, and Colored Plate with PEACOCK.

GUINEA GRASS (*Panicum maximum*, or *jumentorum*). A grass of the same genus as some of the millets, a native of the west of Africa, but now naturalized and extensively cultivated in the West Indies and in the Southern United States. Its height in favorable moist situations is from 5 to 10 feet, or even more; in dry grounds it is smaller. It has a much-branched spreading panicle, long flat leaves, and a somewhat creeping rootstock. In countries favorable to its growth it is very valuable cattle food. In such regions, and upon good soil, the amount of forage this grass yields is very great; it may be cut every month. It has sometimes been confused with Johnson grass, from which it is distinct. Other species of the same genus are among the most useful pasture and forage grasses of tropical countries. See ANDROPOGON.

GUINEA PEPPER. A name variously applied to the seeds of dried fruit of several different plants, which agree in their peppery character and in the place of their production—Western Africa. The name Malaguetta (Malagheta, Meleguetta, etc.) pepper is generally to be regarded as equivalent to Guinea pepper, but properly is a designation of grains of paradise. The capsules of dry berries of Capsicum frutescens are commonly sold by druggists under the name Guinea pepper. Both the names Guinea pepper and Malaguetta pepper have been applied to the dried fruit of Piper clusii, and to the seeds of Xylopia Æthiopica, a shrub of the natural order Anonaceæ. This last, sometimes called Ethiopian pepper, was at one time a considerable article of export from Guinea, but is now seldom heard of. It is an aromatic and not extremely pungent condiment. There is great difficulty in determining which of these kinds is meant in many instances in which the term Guinea pepper or Malaguetta pepper is employed by older writers; yet, from the importance of the trade in this article, the name Grain Coast was given to a great tract of land in the Bight of Benin, and to it the establishment of the settlements of Grand Bassa and Cape Palmas is due. Guinea pepper continued in request up to the close of the eighteenth century, and then the peppers of the East drove it from the market. See GRAINS OF PARADISE; CAPSICUM; CUBEB.

GUINEA PIGS



1. ENGLISH CAVY, solid color (red).
2. PERUVIAN CAVY, broken color (tortoise and white).
3. ENGLISH CAVY, broken color (tortoise and white).
4. ABYSSINIAN CAVY (tortoise shell).

GUINEA-PIG. A popular but incorrect name for a species of cavy (q.v.) abundant in domestication. Some authorities consider it a valid species, *Cavia cobaya;* but it is more probably only a domesticated form of the restless cavy (*Cavia aperea*) of Guiana and Brazil. The guinea-pig is a small animal, about six inches long, usually black, white, and tawny. Recently it has been much used in bacteriological laboratories for the study of germ diseases, and it has long been a popular pet for children. It is exceedingly prolific. The young, which are produced five or six times a year, are very precocious, shedding the milk-teeth before they are hatched. These animals are not pigs, but much more nearly rabbit-like rats; nor are they found in Guinea, but are confined to South America. The 'guinea' is probably a corruption of 'Guiana,' while 'pig' is as accurate as many other popular names.

GUINEA-WORM. A parasitic roundworm (q.v.) (*Dracunculus Medinensis*), especially characteristic of the central and eastern parts of Arabia, but abundant in India, Persia, Nubia, the swampy regions of the White Nile, and Guinea, and found widely distributed in the warmer parts of both hemispheres. Sailors have been known to bring them into New England ports. The adult worm is whitish in color and only one or two millimeters in thickness, although it is sometimes a meter in length. The eggs are laid in water, but the young only reach maturity in the human body, where they come to lie under the skin, in the connective tissue, especially of the extremities, often producing painful sores, and causing the disease filariasis (or dracontiasis), which is accompanied by emaciation and debility. The female is viviparous, while the male is unknown. Carter regards a small worm (*Urolabes palustris*), frequenting brackish waters, as the immature form of the guinea-worm. It is also believed that the embryos enter the bodies of water-fleas (Cyclops, etc.), and there molt, and that consequently they may be introduced into the body by drinking standing water; but this has not been proved. Other species of Filaria occur in the tropics, one of which (*Filaria sanguinis-hominis*) is said to be the cause of the disease elephantiasis (q.v.). This is a worm of microscopic size, found living in the blood of the mosquito in India and China. It is said that the eggs are swallowed in the water drunk by man, are hatched in his intestines and obstruct the smaller blood-vessels, thus causing the disease named, and perhaps even leprosy. Other species of Filaria live in the peritoneum of the horse and of apes, and an immature form (*Filaria lentis*) has been detected in the lens of the human eye.

BIBLIOGRAPHY. T. S. Cobbold, *Entozoa* (London, 1864); R. Leuckart, *Die menschlichen Parasiten* (2 vols., Leipzig, 1863-76); Bastian, "On the Structure and Nature of the Dracunculus," in *Transactions of the Linnæan Society*, vol. xxxiv. (London, 1863).

GUINEGATE, gē'n'-gāt', or **ENGUINEGATTE,** äN'gē'n'-gāt'. A small village in the French Department of Pas-de-Calais, noted as the scene of two defeats of the French, by Maximilian of Austria in 1479, and by Henry VIII. and Maximilian in 1513, the latter engagement being known as the 'Battle of the Spurs' (q.v.).

GUINES, gē'nâs. A town of Cuba in the Province of Havana, about 30 miles southeast of Havana, on the Havana-Cienfuegos Railway (Map: Cuba, C 4). It has some trade in sugar and coffee. In the eighteenth century Guines was the name of a large hacienda, occupying the entire plain, in the middle of which the town was founded by the families of the laborers. It became a chartered town in 1814, but was destroyed by fire in 1817, and did not acquire any importance until 1838, when it became a railroad terminus. It is now well built, and has several notable buildings. Population, in 1899, 11,394.

GUINEVERE, gwin'ē-vêr. A famous figure in the later Arthurian romances. In the earlier versions of the legend her personality is scarcely developed. In the *Vita Gildæ* there is indeed a queen whom King Melvas carries off from Arthur, to be recovered only after a year's search and a siege. In Geoffrey of Monmouth she appears as Guanhumara, "of a noble Roman family, and surpassing in beauty all the women of the island," and she takes the veil after Arthur's defeat by Mordred. As Wenhaver in Layamon's story, she gains little distinctness. It is not till the romance is completed, whether by Walter Map or by Chrétien de Troyes, with the magnificent invention of Lancelot, and of her sinful but romantic love for him, that she reaches her full proportions and becomes "the first perfectly human woman in English literature." The story was treated by other mediæval writers; an incident given by them but omitted by Malory (that describing her first avowal of her love for Lancelot) plays a crucial part in Dante's famous episode of Francesca da Rimini. The character was powerfully treated by Tennyson in the *Idylls of the King*, and a phase of it by William Morris, who, in his *Defense of Guenevere*, remains truer to the original conception of it. See ARTHUR; LANCELOT.

GUINEY, LOUISE IMOGEN (1861—). An American poet and essayist, born in Boston. The daughter of Gen. Patrick R. Guiney, she was educated in Providence. Her more noteworthy volumes of poetry are: *Songs at the Start* (1884); *The White Sail and Other Poems* (1887); *The Martyr's Idyl, and Shorter Poems* (1899). She wrote also much in prose, for example: *Goose-Quill Papers* (1885); *Monsieur Henry, a Footnote to French History* (1892); *A Roadside Harp* (1893); *A Little English Gallery* (1894); *Patrins: A Collection of Essays* (1897). She has edited an edition of J. C. Mangan's *Poems*, and shared with Mrs. Spofford and Alice Brown the authorship of *Three Heroines of English Romance* (1894).

GUINGAMP, gäN'gäN'. The capital of an arrondissement in the Department of Côtes-du-Nord, France, on the Trieux, 20 miles northwest of Saint-Brieuc (Map: France, C 3). It was formerly the capital of the Duchy of Penthièvre, and was surrounded by walls, of which there are remains. The site of the ducal castle is now planted with trees, and serves as a promenade. The town is a noted place of pilgrimage in Brittany for the annual 'pardon' at its mediæval church of Notre Dame de Bon Secours. A restored fifteenth-century fountain is a noteworthy monument in the town. Guingamp—whence gingham—has the original manufactories of that linen fabric, hat-factories, tanneries, and a considera-

ble cattle and agricultural trade. Population, in 1901, 9252.

GUINICELLI, gwē'nē-chĕl'lē, GUIDO (c.1240-76). An Italian poet, born in Bologna. He studied jurisprudence, and seems to have practiced law in his native city. In politics he was Ghibelline, and so was banished with the rest of the Lambertazzi party in 1274, and died in exile. Dante considers him the father of Italian poets, and he was the first to introduce a higher philosophical spirit into Italian poetry, which had hitherto been only of the troubadour variety. "He was," says one critic, "the head of that Bolognese school to which belong Lapo Gianni, Cino da Pistoja, and Guido Cavalcanti." Of his verse only seven canzoni and five sonnets remain. The best known of them is the canzone of *The Gentle Heart* (as finely translated by D. G. Rossetti), which Dante praises. These are printed in Nannucci, *Manuale della letteratura del primo secolo della lingua italiana* (Florence, 1843). Consult: Grion, *Guido Guinicelli e Dino Campagni* (Bologna, 1870); Cassini, *Le rime dei poeti Bolognesi del secolo XIII.* (ib., 1881); and D. G. Rossetti, *Dante and His Circle* (London, 1874).

GUINOBATAN, gē'nō-bä'tän. An inland town of Luzon, Philippines, in the Province of Albay. It lies about 11 miles west of Albay (Map: Philippine Islands, H 6). Population, in 1898, 20,500.

GUIRAUD, gē'rō', ERNEST (1837-92). A French dramatic composer, born in New Orleans, La., of French parentage. His first studies were under his father (a music teacher, and the winner of the Prix de Rome in 1827), and later (1849) he studied in Paris under private teachers. In 1852, when but fifteen years of age, he returned to New Orleans, and superintended the production of his first opera, *Le Roi David*, after which he went back to Paris and made it his permanent home. He studied at the Conservatory, and won the Grand Prix de Rome with his *Bajazet et le joueur de flûte* in 1859. He served throughout the Franco-Prussian War of 1870-71, and in 1876 became a member of the faculty of the Paris Conservatory. He was the composer of many successful operas, among them *Sylvie* (1864), *Le Kobold* (1870), *La galante aventure* (1882); orchestral suites, and minor compositions, as well as of a solemn high mass. He died in Paris. *Brunhilde*, an unfinished opera, was completed by Saint-Saëns and produced in Paris as *Frédégonde* (1895).

GUISBOROUGH, gīz'brŭ. A market-town in the North Riding of Yorkshire, England, on the North Eastern Railway, 7½ miles east-southeast of Middlesborough (Map: England, F 2). Neighboring mines supply the Cleveland iron ore used in steel-founding, which constitutes its chief industry. Its historical interest centres in the ruins of the Augustine priory, built in 1119 by Robert de Brus, grandfather of King Robert Bruce, and up to the time of its dismantlement by Henry VIII. one of the wealthiest of English monastic institutions. Population, in 1891, 5625; in 1901, 5650. Consult *Cartularium Prioratus de Gyseburne, Fundati A.D. 1119* (Durham, 1889).

GUISCARD, gēs'kär', ROBERT (c.1015-85). Duke of Apulia and Calabria. He was the son of Tancred of Hauteville, and was born near Coutances, in Normandy. His elder brothers, William of the Iron Arm, Drogo, and Humphrey, had gone to Italy to seek their fortunes soon after 1030, and had been very successful. Robert followed them about 1047, but was badly received by them. At first he served under the Prince of Capua, and then acted as the leader of a band of adventurers, endeavoring to secure possessions for himself in Calabria. In 1053 he took a prominent part in the battle near Civitate, in which the Papal forces, led by Leo IX., were defeated by the Normans. In 1057, after the death of Humphrey, Robert became Count of Apulia. About this time he was joined by his brother Roger, who aided him greatly in his conquests. In 1059 Robert concluded a treaty with Pope Nicholas II., who made him Duke of Apulia and Calabria, and 'future Duke' of Sicily, if he could conquer the island. Robert, 'Duke by the grace of God and of Saint Peter,' became the Pope's vassal. This gave the Papacy a feudal supremacy over Southern Italy which lasted for centuries. In 1060 Roger engaged in the subjugation of Sicily. He was joined in the following year by Robert, and Messina was captured. The conquest proceeded slowly. Palermo was taken in 1072, and the subjugation of the island was not completed till about 1090, long after the death of Robert. On the southern mainland, however, the supremacy of the Normans was firmly established by the capture of Tarentum and Reggio in 1068, and Bari in 1071. In 1074 Robert incurred excommunication by attacking Benevento, which was a Papal possession; but in 1080 there was a reconciliation between Gregory VII. and the Norman duke, who renewed the oath which he had made in 1059. After establishing a magnificent principality on the ruins of the Byzantine power in Southern Italy, Robert proceeded to invade the territory of the Byzantine Empire in the Balkan Peninsula, acting as the champion of the heir of Michael VII., who had been deposed by Alexius Comnenus. In 1081 he gained a great victory over Alexius at Durazzo, and captured the city in the following year. The war in Macedonia and Thessaly was carried on mainly by his son, Bohemund (q.v.). From his victorious campaigns Robert was recalled in 1084 to the aid of Gregory VII., who was besieged in the castle of Saint Angelo by Henry IV. (q.v.). Robert captured and sacked Rome, many of the inhabitants being killed or sold into slavery. He then prepared to renew the war against Alexius, but died at Cephalonia, July 17, 1085. He is described by Anna Comnena (q.v.) as of lofty stature, large frame, and commanding appearance. He was extremely brave, ambitious, and shrewd, but pitiless. The surname Guiscard (sly) is said to have been given him because of his ability and craft. Consult Johnson, *The Normans in Europe* (London, 1877).

GUISCARD, ROGER. See ROGER I.

GUISCHARD, gē'shär', KARL T. See GUICHARD.

GUISE, gwēz (ML. *Guisia*). A town in the Department of Aisne, France, on the left bank of the Oise, 25 miles from Saint-Quentin by rail (Map: France, K 2). It is strongly fortified, has the ruins of a sixteenth-century castle, from which the famous dukes of Guise (q.v.) derived their title, and a statue of Camille Desmoulins, who was born here. Its industrial feature is the

coöperative stove-factory, employing about 1500 hands, and its *familietère* or workman's colony with a phalanstery, or common dwelling-house, accommodating 400 families, founded by Godin, a follower of Fourier. Population, in 1901, 7310. Guise was a noted strategical place as early as the eleventh century. It gave its name to a county, which later was erected into a duchy. The town was burned by the English under John of Hainault in 1339, but their assaults on the castle were foiled by his daughter, wife of the lord of the fortress.

GUISE. The name of the most famous branch of the ducal family of Lorraine, the members of which played a prominent part in the history of France and Europe during several centuries. The family derived its name from the town of Guise (q.v.), and claimed an ancestry reaching back to Merovingian times. In 1333 Marie of Blois married Rodolf, Duke of Lorraine, and brought with her as part of her dower the county of Guise. The following are the most celebrated members of the Guise family: CLAUDE DE LORRAINE (1496-1550), first Duke of Guise, Count of Aumale, Marquis of Mayenne and Elbœuf, and Baron of Joinville, was the fifth son of René II., Duke of Lorraine. He was endowed by his father with the French fiefs of the family, while Lorraine went to his elder brother. Claude accompanied Francis I. in all his Italian campaigns, receiving a severe wound at the outset in the battle of Melegnano (1515). Eight years later he drove the Imperialists from Champagne. In 1527 he became Duke of Guise, a peer of France, and Governor of Champagne as a reward for his suppression of the peasant revolt. In 1542 he fought in Flanders under the Duke of Orleans. He married Antoinette de Bourbon, and his daughter Mary was the wife of James V. of Scotland, and mother of Mary, Queen of Scots.—FRANÇOIS DE LORRAINE, second Duke of Guise, son of the preceding, and known as *la Balafré*, the Scarred, was born February 17, 1519. He won world-wide renown as a brave and skillful soldier, distinguishing himself at Montmédy (1542), Landrecies (1543), Saint-Dizier (1544), and at Boulogne (1545), and by his successful defense of Metz for two months in 1552 against Charles V. In 1557 he had command of the expedition against the Spaniards in Italy, which failed through lack of proper support. The Duke was recalled, and in 1558 took Calais, the last stronghold of the English in France. His niece, Mary Stuart, being the wife of Francis II., he enjoyed for a time the highest power at Court. After the death of the King, the jealousy of the queen-mother, Catharine de' Medici (q.v.), forced him into temporary retirement, but with the Constable Montmorency and Marshal Saint-André he formed the coalition known as the Triumvirate, and it was probably at his instigation that the massacre of Huguenots at Vassy was perpetrated, March 1, 1562, which marked the beginning of the civil wars. He took Rouen, and won a victory at Dreux (December 19, 1562), but was assassinated before Orléans, February 18, 1563, by a Protestant fanatic, Poltrot de Méré, and died six days later. Guise cannot be cleared from the charge of cruelty and ferocity, though he was doubtless much influenced by his brother Charles, the Cardinal of Lorraine. He had a taste for literature, and his memoirs have considerable historic interest.—CHARLES DE LORRAINE, brother of the preceding, was born February 17, 1525. He entered the Church, became Archbishop of Rheims in 1538, and was created a cardinal in 1547. He was known as the Cardinal of Guise until the death of his paternal uncle, when he took the title of Cardinal of Lorraine, by which he is known in history. He was deeply involved in the political intrigues of the time, and inspired much that was worst in the policy of his house, of which he became practically the head after the assassination of his brother. His vacillation and cowardice rendered him inefficient as a leader, and his influence declined from the moment when he became responsible for the execution of his own designs. He introduced the Inquisition into France in 1558, and the responsibility for the cruel excesses following the tumult of Amboise (1560) rests upon him. He was licentious in his private life. His brother LOUIS (1527-78) received the title of Cardinal of Guise after Charles became Cardinal of Lorraine, but was a figure of little importance historically.—HENRI I. DE LORRAINE, third Duke of Guise, son of François de Guise, was born December 31, 1550. At the age of fifteen he distinguished himself fighting against the Turks in Hungary. He fought against the Huguenots at Saint-Denis (1567), Jarnac (1569), and Moncontour (1569), and forced Coligny to raise the siege of Poitiers. He aspired to the hand of Margaret of Valois, but, to appease the anger of the young King, Charles IX., he married Catharine of Cleves (1570). He left the Court because of the favor shown to the Huguenots, but soon returned and took an active part in the massacre of Saint Bartholomew, leading in person the assault upon the house of Coligny, whose body was thrown at his feet in the courtyard. In the fight against the Huguenots at Dormans (October 10, 1575) he received a wound which left a scar from which he was given his father's sobriquet, *le Balafré*. For his part in this battle he became an object of unreasoning idolatry on the part of the Parisians, and he used this shrewdly to advance the power of his house. It soon became common talk that the Valois were illegitimate, and the Lorraines the true heirs of Charlemagne. Guise was a prime mover in the formation of the Holy League (1576), the primary object of which was to shut the Bourbons, whose head was Henry of Navarre, out of the succession and to bring in the Guises. The League became dormant, but was revived in 1584, and entered into alliance with Philip II. of Spain by the Treaty of Joinville, to uphold the Catholic cause. Henry III. wavered between the equally dangerous parties of Bourbon and Guise, but finally decided first to put down the Huguenots, and came to an agreement with Guise at Nemours. In the following War of the Three Henrys, Guise defeated the German allies of the Huguenots at Vimory and Auneau (1587), while the royal forces were defeated by those of Henry of Navarre. On account of the increasing popularity of Guise, the King ordered him to keep away from Paris; but he defied this command, and there followed the Day of the Barricades in Paris (May 12, 1588), when the King of France and Guise, who was called the King of the Parisians, were arrayed against each other. Finally the King retired to Blois, and summoned the Estates, appearing to yield to his defiant vassal, who was induced to go

to Blois and to respond to a summons of the King to a private audience in the royal cabinet. There he was assassinated by members of the royal guard, the famous Forty-Five, December 23, 1588. His brother, another Cardinal of Lorraine (1555-88), was arrested and put to death on the following day.—CHARLES DE LORRAINE, Duke of Mayenne, born March 26, 1554, was brother of Henry I. de Lorraine, under whom he fought in the Huguenot wars, distinguishing himself at Moncontour and Brouage. After the assassination of his brother he went to Paris and took command of the forces of the League, which he organized more thoroughly than they had ever been before. He proclaimed the Cardinal of Bourbon King, and made himself lieutenant-general of the kingdom. He was defeated by Henry IV. at Arques (1589) and Ivry (1590), but carried on the struggle until 1596, when he made his submission to the King, and was one of his most loyal subjects until his death, in 1611.

CHARLES DE LORRAINE (1571-1640), son of Henry I. and fourth Duke of Guise, was succeeded by his second son, HENRI II. DE LORRAINE, fifth Duke of Guise, who was born April 4, 1614. Henri had been trained for the Church, and was Archbishop of Rheims when the death of his elder brother (1639) caused him to abandon ecclesiastical life. He was brilliant, but fickle in his attachments, and noted for many amours. He joined the league of the Count of Soissons against Richelieu (1641), and took refuge in Brussels, returning only after the death of Richelieu and Louis XIII. He went to Naples during the revolt of Masaniello, hoping to conquer a kingdom, but was made a prisoner by the Spaniards (1648). He was set at liberty in 1652, and joined the opponents of Mazarin, but soon betrayed them, and after numerous vicissitudes returned to Paris, was made Grand Chamberlain, and directed the fêtes of Louis XIV. He died in 1664. His *Mémoires* (2 vols., 1669) were really written by his secretary, Saint-Yon, and by Count Raymond of Modena. Henri II. was succeeded by his nephew, LOUIS JOSEPH, Duke of Guise, Joyeuse, and Angoulême. With the son of the latter, FRANÇOIS JOSEPH, who died in 1675, the direct line of the dukes of Guise of the House of Lorraine became extinct. The family possessions passed to the House of Condé, the next of kin.

BIBLIOGRAPHY. For the general history of the house, consult: Forneron, *Les ducs de Guise et leur époque* (Paris, 1893); Bouillé, *Histoire des ducs de Guise* (Paris, 1849-50); for individual biographies and special works, see: Brisset, *François de Guise* (Paris, 1840); Cauvin, *François de Lorraine, duc de Guise* (Paris, 1885); Valincourt, *Vie de François de Guise* (Paris, 1881); De Croze, *Les Guises, les Valois, et Philippe II.* (Paris, 1866); Renauld, *Henri de Lorraine, duc de Guise* (Paris, 1879); Ruble, *L'assassinat de François de Lorraine, duc de Guise* (Paris, 1897); Zeller, ed., "Charles IX. et François de Guise, extraits des lettres de Catherine de Medicis," in *L'histoire de France racontée par les contemporains* (Paris, 1887). Consult also general works referred to under the history of France. See HUGUENOTS; LORRAINE.

GUITAR, gĭ-tär′ (OF. *guiterre, guiterne,* Fr. *guitare,* from Lat. *cithara,* Gk. κιθάρα, *kithara,* lyre). A musical stringed instrument, somewhat like the lute, particularly well adapted for accompanying the human voice, and much esteemed in Spain and Italy. It has six strings, tuned as follows: E, A, d, g, b, e^1. Its compass is over three octaves, from E to a^3. The music of the guitar is always written in the G clef, and thus the actual sound is an octave lower than written. The sound is produced by the fingers of the right hand plucking the strings, which are stopped by the fingers of the left hand pressing them against the frets. The three highest strings of the guitar are usually of gut, and the three lowest are of silk spun over with silvered wire.

GUITAR-FISH (so called from the shape of the fish). A long-nosed, shark-like ray of the family Rhinobatidæ. It differs from the Raiidæ mainly by the peculiarity that the eggs are hatched within the body. The name is copied from the Spanish *guitarro,* applied especially to species of the Gulf of California. The best known is the California *Rhinobatus productus.* A familiar form from Jamaica to Brazil is the 'pureque' or 'fiddler-fish' (*Rhinobatus percellens*).

GUITEAU, gê-tō′, CHARLES J. See GARFIELD, JAMES A.

GUITGUIT, gwĭt′gwĭt′. See GUIDGUID.

GUITTONE D'AREZZO, gwê-tō′nâ dâ-rĕt′sô (c.1230-c.1294). An Italian poet, born near Arezzo. It is said that in his youth he devised the sonnet form. He was very well educated for the time, and wrote much in the troubadour style. In 1293 he founded the monastery Degli Angeli in Florence. During the latter part of his life he wrote of theological and political subjects, in dreary, unattractive verses. Nevertheless, he had a decided influence on his contemporaries, and was one of the first of Italian prose writers. His letters (*Lettere*) were not published until 1745. His poetry is better than his prose. The best edition of his works is that by Valeriani, *Rime di Fra Guittone d'Arezzo* (Florence, 1828 and 1867). Consult Romanelli, *Di Guittone e delle sue opere* (Campobasso, 1875).

GUIZOT, gwē′zō′, by foreigners commonly pronounced gē′zō′, ELIZABETH CHARLOTTE PAULINE (DE MEULAN) (1773-1827). A French author, the first wife of Guizot, the historian. She was born in Paris. Her father having died when she was eighteen years of age, she sought subsistence for herself and the straitened family by literary labor. She published *Les contradictions,* a novel, in 1800; afterwards joined the staff of Suard's journal, *Le Publiciste,* and as literary and artistic editor became known for her critical articles, a selection of which were published in 1802 as *Essais de littérature et de morale.* Ill health would have interrupted the series in 1807, had they not been continued by an anonymous writer, who later revealed himself as Guizot. The friendship thus begun resulted in their marriage in 1812, and during their married life she was of great assistance to her husband in his historical studies and literary work. Her subsequent writings, devoted to the moral improvement and education of the young, are: *Les enfants* (1812); *Le journal d'une mère* (1813); *L'écolier, ou Raoul et Victor* (1821); *Nouveaux contes à l'usage de la jeunesse* (1823); and *Education domestique, ou Lettres de famille sur l'éducation* (1826). Her husband published several posthumous volumes of her essays and other writings.

GUIZOT, François Pierre Guillaume (1787-1874). A distinguished French historian and statesman, born at Nîmes, October 4, 1787, of Protestant parents. His father was an advocate of liberal views, was guillotined during the Reign of Terror (April 8, 1794), and his mother soon afterwards went with her two sons to Geneva, where young Guizot received his education. In 1805 he went to Paris to study law, but instead devoted himself to literature. His first work, the *Nouveau dictionnaire universel des synonymes de la langue française*, appeared in 1809, and was quickly followed by an essay on the fine arts and a translation of Gibbon. In 1812 he married Mlle. de Meulan, who was the editor of *Le Publiciste*, and fourteen years his senior. In the same year he became a professor of history at the Sorbonne. After the Restoration he became general secretary in the Ministry of the Interior, and subsequently secretary in the Ministry of Justice. Guizot contributed to the dissolution of the Chambre Introuvable (q.v.) by a memorial which was placed in the hands of Louis XVIII. by Decazes. The latter committed to him the general direction of the administration of the communes and departments (1819). At this time he attached himself to the Constitutional Party, whose leaders were subsequently known as doctrinaires (q.v.), expounding its principles in his essay, *Des moyens de gouvernement et d'opposition dans l'état actuel de la France* (1821). In 1821-22 he published his *Histoire des origines du gouvernement représentatif*, containing his lectures at the Sorbonne. Owing to his attacks on the Villèle Ministry, Guizot lost his official position, and for a number of years devoted himself to literary work. His *Histoire de la révolution d'Angleterre* appeared in 1827, and he edited the *Encyclopédie Progressive* and the *Revue Française*, which he established in 1828. His first wife having died (1827), he married her niece. In 1829 the Martignac Ministry granted him permission to resume his lectures on history. They were attended by large and enthusiastic audiences, and gave rise to several historical works of great value, published under the collective titles of *Cours d'histoire moderne* (1828-30), which included the *Histoire de la civilisation en France*, and the *Histoire générale de la civilisation en Europe*. In January, 1830, he was elected to the Chamber of Deputies from Lisieux, and sided with the opposition, vigorously attacking the Polignac Ministry. After acting as Minister of Education in the Provisional Government which succeeded the overthrow of the Bourbons, he was made Minister of the Interior (August 11, 1830), but resigned in November. He was Minister of Public Instruction in the Cabinet formed by Soult in 1832, and held that position, with a brief interval, until 1837. In this capacity he did much for the improvement of educational institutions, particularly for the primary schools. During the Oriental crisis of 1840 arising from the ambitions of Mehemet Ali (q.v.) of Egypt, Guizot was sent as Ambassador to London, where he met with a cordial reception, and returned to France in October of the same year, on the resignation of the Thiers Ministry, to become Minister of Foreign Affairs and the chief of Louis Philippe's supporters, as the virtual head of the Soult Ministry. After Soult's retirement, in September, 1847, he became the official head of the Cabinet, which, however, although Guizot by his conduct, both in home and foreign affairs, had done all that was possible to make constitutional government a success in France, could not much longer retain its hold upon the people. The policy of peace at any price and the suppression of the republican spirit caused its final overthrow and the fall of the July Monarchy, February 23-24, 1848. As a statesman Guizot proved himself stiff and obdurate; from these qualities, as well as from his cold and austere manner, he was always unpopular with the masses. Guizot escaped from Paris to London. In April, 1849, he published a circular in which he offered his services to the electors of France. He returned to France in November, 1849, but was defeated as a candidate for the Chamber. The coup d'état of December 2, 1851, put an end to his political career. The rest of his life was passed in retirement, and was devoted to historical and literary work. He lived to see many changes in France, and died, at the age of eighty-seven, at his villa in Val-Richer, September 13, 1874. By founding the *Comités historiques*, by bringing about the publication of important historical documents, and by his own writings and lectures, Guizot did much for historical study in France. A work on Washington, published under the title *Vie, correspondance et écrits de Washington* (Paris, 1839-40), procured him the honor of having his portrait placed in the Chamber of Representatives at Washington. Of Guizot's numerous works the most important, in addition to those already mentioned, are: *De la démocratie en France* (1849); *Etudes biographiques sur la révolution d'Angleterre* (1851); *Etudes sur les beaux-arts* (1851); *Corneille et son temps* (1852); *Shakespeare et son temps* (1852); *Histoire de la république d'Angleterre et d'Oliver Cromwell* (1854); *L'amour dans le mariage* (1855); *Histoire parlementaire de France* (1863); *Méditations sur la religion chrétienne dans ses rapports avec l'état actuel des sociétés* (1865-68); *Mélanges biographiques et littéraires* (1868); *Mélanges politiques et historiques* (1869). For the life of Guizot, the most valuable materials are his own *Mémoires pour servir à l'histoire de mon temps* (Paris, 1858-65; Eng. trans. London, 1858-62); Madame de Witt (Guizot's daughter), *Monsieur Guizot dans sa famille et avec ses amis* (Paris, 1880; Eng. trans. London, 1880); Simon, *Thiers, Guizot, Rémusat* (Paris, 1885); Bardoux, "Guizot," in *Les grands écrivains français* (Paris, 1894); Crozals, "Guizot," in *Classiques populaires* (Paris, 1891); Wilson, "M. Guizot and His Memoirs," in *Studies in Modern Mind and Character* (London, 1881); Mazade, *Portraits d'histoire morale et politique du temps* (Paris, 1875).

GUJARAT, gōō'zhä-rät'. A geographical division of India, extending along the northern seaboard of the Province of Bombay (Map: India, B 4). It comprises the Kathiawar Peninsula, and, on the mainland, Baroda (the dominion of Gaekwar) and other native States. It is bounded on the north by Rajputana and on the south by Concan. The Vindhya and Satpura mountains extend into the region from the east. Area, 41,536 square miles; population, over 11,000,000. The surface generally is level and monotonous. The chief rivers are the Ner-

budda and Tapti. The products are cotton, rice, wheat, barley, maize, tobacco, sugar, opium, and fruits. The name Gujarat is frequently applied to the British Northern Division of Bombay, which comprises the districts of Ahmadabad, Kaira, Panch Mahals, Broach, Surat, and Tanna. Area, 13,710 square miles; population, in 1891, 3,918,100; in 1901, 3,510,200.

GUJARĀTĪ (gōō'zhä-rä'tē) **LANGUAGE AND LITERATURE.** The language of Gujarat in Western India, which is spoken by almost 11,000,000 persons. It is derived, through the mediæval vernaculars called Prakrit, especially the Saurasení, Apabhramsa, from ancient dialects closely akin to Sanskrit. It contains many words borrowed from Sanskrit, Arabic, and Persian. Its alphabet is a modification of the ancient Devanagarí script of the Sanskrit, with the bar above the letters omitted.

Gujarati literature is abundant and of fair character. It begins with Narsingh Mehta in the fifteenth century, who composed short poems on religious subjects. Other poets of note were Vishnu Das, Shiv Das, and Samal Bhatt.

Consult: Taylor, *Student's Gujarāti Grammar* (London, 1895); Bengali and Merchant, *New Pocket Gujarāti into English Dictionary* (Bombay, 1899); Blumhardt, *Catalogue of Marathi and Gujarati Printed Books in the Library of the British Museum* (London, 1892); Tripāthi, *Classical Poets of Gujarat* (Bombay, 1894).

GULBAR'GA, KULBAR'GA, or **CALBUR'GA.** A town of Hyderabad, India, 110 miles west of Hyderabad by rail (Map: India, C 5). It stands on a minor affluent of the Kistna, and has been successively the capital of Hindu and Mohammedan sovereignties. The town's ancient prosperity is reviving, modern buildings, public offices, barracks, a fine bazar, a model jail, and ornamental gardens relieving the archaic aspect of numerous mosques and tombs. The chief feature of interest is the fort containing the citadel and a unique mosque built in the thirteenth century after the design of the great Cordova mosque in Spain. Population, in 1891, 28,200; in 1901, 29,228.

GULDBERG, gōōl'bĕrg, Ove Höegh (1731-1808). A Danish statesman and author, born at Horsens. He became preceptor of Crown Prince Frederick, the son of Christian VII., and managed the coup d'état that overthrew Queen Caroline and Struensee. By this means he became secretary of the Cabinet (1773) and Secretary of State (1776). Under his leadership the country gained in importance and power. When the King reached his majority (1784), Guldberg was sent to Aarhus as Grand Bailiff (1784-1802). He wrote a valuable *Universal History* and some theological works.

GULDEN, gōōl'dĕn. See Florin.

GULES, gūlz (from OF., Fr. *gueules*, red, from OF. *gole, goule*, Fr. *gueule*, throat, from Lat. *gula*, throat). The name for the color red in heraldry (q.v.).

GULF OF CAR'PENTA'RIA. See Carpentaria, Gulf of.

GULF STREAM. The most important and best-known current in the Atlantic Ocean, deriving its name from the Gulf of Mexico, out of which it flows between the coast of Florida on the west and the Bahamas on the east. Its breadth in the narrowest portion is about 50 miles, and its depth about 2000 feet; the velocity averages between two and three miles per hour, reaching an extreme of five or six miles in some localities. This great mass of warm water, having a temperature several degrees higher than the neighboring ocean, flows northeastwardly along the American coast, but can no longer be distinguished from the rest of the ocean drift by either temperature, saltness, color, or motion, after it has passed latitude 40° N. and the meridian 60° W. As it passes the thirty-second parallel between the Bermudas and the coast of Carolina it is divided into several small streams of about 100 fathoms deep and aggregating 150 miles wide. North of this region the increasing westerly winds so break up the surface and mix the waters that it is improper to speak of the Gulf Stream as having any further existence; since it becomes the general drift of warm water from the southwestern Atlantic northeastward to Europe, which is a general phenomenon that has little or nothing to do with the special Gulf Stream, properly so called.

By means of floating derelicts, bottles, and buoys, the general drift of the ocean surface currents has been studied with great care. This drift is seen to depend wholly on the wind, and may trend to the northeast or southeast as the winds and storms vary. The majority of the derelicts in the Atlantic Ocean circulate around the Sea of Sargasso, but occasionally one penetrates directly through it. Very rarely does a derelict make its way from America to the European coast. Where the western edge of the so-called Gulf Stream passes by and intermingles with the cold northerly drift, close to the coasts of Newfoundland and New England, banks of fog are formed; but these are not the fogs that trouble navigation. The latter are due to the flow of warm southwest winds over the cold ocean water, and therefore depend for their existence on the wind rather than on the Gulf Stream. It is a common error to attribute the warmth of Europe, as compared with the cold in America in the same latitude, to the influence of the Gulf Stream; meteorology shows that the southwest winds of Europe, bringing moisture from the ocean, are not appreciably affected by the Gulf Stream. On the other hand, this deep layer of moist southwest wind contains far more latent heat than the same quantity of dry air at the same temperature; and it is the evolution of latent heat by this moist air in the formation of fog, cloud, and rain that raises the temperature of the atmosphere over Europe, and prevents loss of heat by radiation. Precisely the same phenomenon is found on the leeward side of each of the Great Lakes, and of the Mediterranean Sea, the Baltic, and probably every other large sheet of water.

The mechanical cause of the Gulf Stream has been clearly expounded by William Ferrel. It is not caused wholly by the winds. The steady northwest trade winds are not strong enough to raise any considerable mass of water in front of them. Hurricane winds may raise the level several feet temporarily, but the trade winds scarcely an inch. The accurate levelings of the Coast and Geodetic Survey have shown that there is no appreciable difference of level between the water in the Gulf of Mexico and that of the Atlantic on the opposite coast of Florida. The

Gulf Stream is a result of the general vertical circulation of the ocean, bringing from the north cold water which sinks below, while the warm water of the equatorial region rises, and slides northward above the cold current; owing to the rotation of the earth, each of these currents deviates toward the right, so that the cold current presses toward the southwest and the surface current toward the northeast. These pressures are very slight, but by acting for long ages they have given the upper layers of the ocean a slight general rotation. By thus being pushed against the shores or through narrow channels, the mass of water far below the influence of surface winds is forced to seek its channel of easiest flow, and the cold water flowing through certain passages between the West Indian Islands into the Caribbean Sea flows thence into the Gulf of Mexico, and finally it rounds Cape Sable as warm water from the gulf. The Gulf Stream really has its origin in deep currents far east of the Windward and Leeward Islands, and is pressed northward beyond Cape Sable by the force of the water pushing behind it from the Atlantic Ocean into and through the Caribbean Sea. In other parts of the globe there are great ocean currents that depend wholly upon the winds, but this does not seem to be the case with the Gulf Stream.

BIBLIOGRAPHY. Ferrel, *Winds of the Globe* (New York, 1895); Agassiz, *Three Cruises of the Blake* (Boston, 1888); Pillsbury, in *Annual Report*, published by the United States Coast Survey (Washington, 1890); Thomson and Blake, *Reports of the Scientific Results of H. M. S. Challenger* (London, 1880-95).

GULFWEED. A popular name of *Sargassum*, one of the brown algæ. The plants are torn from the coast and carried by currents out to sea, where they grow and form large masses of floating weed in the eddies of oceanic currents. See PHÆOPHYCEÆ.

GULISTAN, gōō'lē-stän' (Pers., rose-garden). The most famous work of the Persian poet Sadi (q.v.), a collection of moral discussions interwoven with stories, puns, and maxims. It is contained in eight chapters in prose and verse. There are English translations by Eastwick (Hertford, 1852); Gladwin (Boston, 1865); and Sir Edwin Arnold (London, 1899).

GULL (from Corn. *gullan*, Welsh *gwylan*, Bret. *gwelan*, gull). A web-footed bird of the subfamily Larinæ, of the family Laridæ. The gulls are inhabitants of the seacoasts of all parts of the world, and also of the shores of large rivers and lakes far inland. The bill is strongly hooked at the tip, thus differing from that of the terns, and lacks a cere, in this respect differing from that of the jägers. The tail is usually square across the tip, and the wings are long and pointed. The plumage is generally in great part white, variously mixed with gray, slate-color, brown, and black. The white in some species assumes a rosy tint in the breeding season, and the head of some becomes black. The differences of plumage, according to age, season, and sex, are very considerable, and have led to many errors as to species. Gulls have great power of wing, and delight in performing varied and beautiful evolutions. They descend with great rapidity to seize prey from the surface of the water, or at a small depth; but they are not good divers, and the fishes caught are chiefly those which, like the herring, swim near the surface. They are very voracious. Their food consists of almost anything animal, and they frequently rob other birds' nests of eggs or young. In winter they throng harbors, and feed largely on scraps thrown from ships or drifted upon the shores. The larger gulls seize clams and other mollusks, carrying the large ones into the air and dropping them upon a rock in order to break them. The flesh of gulls is rather coarse, but that of the young is in request on many northern coasts as an article of food, and is salted for winter use. The eggs are palatable, and are collected in great quantities in some places. All gulls are wholly or partially migratory; they breed in colder regions than those which they inhabit in winter. In general, they lay only two or three eggs, which are large for the size of the bird, bluish-white to brownish-olive in color, more or less heavily spotted, blotched, and marked with brown, black, and purplish. The nest is composed of moss and seaweeds, or marsh-weeds, and is usually on the ground in swamps or on rocky cliffs. Occasionally, however, the nest is built in trees, and is then based on a foundation of sticks.

About 50 species of gulls are known, of which about 26 are found in North America. The commonest and most widely distributed are the ring-billed gull (*Larus Delawarensis*) and the herring gull (*Larus argentatus*, var. *Smithsonianus*). The latter is two feet long and nearly five feet across the wings, while the former is considerably smaller. Both species are abundant on the Atlantic coast, in the Mississippi Valley, and about the Great Lakes. They breed from the United States northward. The kittiwake (*Rissa tridactyla*), rather smaller than the first named, gray and white, and destitute of a hind toe, is plentiful in Arctic America and Europe, where the coast is girt with rocky precipices, on the narrow ledges of which it makes its nest. Its young and eggs are among the chief objects of pursuit of the rock-fowlers. The great black-backed gull, or 'wagell' (*Larus marinus*), nearly thirty inches long, is found on the Atlantic coasts of both Europe and America; and the glaucous gull, or 'burgomaster' (*Larus glaucus*), scarcely inferior to it in size, of a pale bluish-gray color above and white below, is a winter visitant from the Arctic regions.

On the Pacific coast of North America, the common gulls are the glaucous-winged gull (*Larus glaucescens*), the California gull (*Larus Californicus*), and the western herring gull (*Larus occidentalis*), all large birds, four feet and a half across the wings. Smaller than these is the white-headed gull (*Larus Heermanni*), which is lead-colored, with a white head and red bill; it is common on the coast of California. Other notable gulls are the common mew (*Larus canus*) of Europe; the red-legged kittiwake (*Rissa brevirostris*) of Bering's Sea; the Arctic ivory gull (*Larus alba*), the entire plumage of which is pure white; the black-headed gulls of Europe and America (*Larus ridibundus* and *atricilla*); Franklin's and Bonaparte's rosy gulls (*Larus Franklini* and *Philadelphia*), the white under parts being suffused with rose during the breeding season; Ross's rosy gull (*Rhodostethia rosea*), which has a wedge-shaped tail, and is white, rosy tinted, with a black collar, and occurs only in the

most northern regions; and the forked-tail gulls (*Xema Sabinii* and *furcatus*), the former Arctic and common, small, the latter tropical, very rare, and large. Terns, boobies, and various other marine birds are often very improperly called gulls. Consult Saunders, "Revision of the Larinæ," in *Proceedings of the Zoological Society of London* (London, 1878). See Plate of AUKS, ALBATROSSES, ETC.

GULL, Sir WILLIAM WITHEY (1816-90). An English physician. He was born in Thorpe-le-Soken, graduated at London University in 1841, and from 1843 to 1865 was a teacher first of natural philosophy, then of physiology and comparative anatomy, and finally of medicine at Guy's Hospital, to which he was also for twenty years physician. From 1847 to 1849 he was a professor at the Royal Institution, and in 1848 became a fellow of the Royal College of Physicians. He was president of the Clinical Society, member of many other associations, and the author of numerous valuable papers on medical subjects.

GULLET. See ŒSOPHAGUS.

GUL'LIVER, JOHN PUTNAM (1819-94). An American clergyman of the Congregational Church. He was born at Boston, Mass., graduated at Yale in 1840, and at the Andover Theological Seminary in 1845, and held pastorates at Norwich, Conn. (1846-65) (where he will always be remembered as the promoter of the Norwich Free Academy); Chicago, Ill. (1865-68); and Binghamton, N. Y. (1872-78). From 1868 to 1872 he was President of Knox College (Galesburg, Ill.), and in 1878 was appointed professor of the relations of Christianity and science in the Andover Theological Seminary.

GULLIVER'S TRAVELS, OR TRAVELS INTO SEVERAL REMOTE NATIONS OF THE WORLD. A famous satirical romance by Jonathan Swift, narrating the travels and adventures of Lemuel Gulliver, surgeon, and then captain of several ships. It was first published anonymously in 1726, and obtained an immediate success among all classes, which has ever since been maintained. The plan and form of the romance were influenced by the works of Lucian, Cyrano de Bergerac, and Defoe. It is in four parts, of which the first describes the hero's voyage to Lilliput, the land of pygmies; the second, his adventures in Brobdingnag, among the giants; the third, his journey to Laputa, a country of quacks and pretended scientists; and the fourth his visit to the Houyhnhnms, horses endowed with superior intelligence. The characters and events are in great part satires on prominent personages and political and scientific conditions of the day.

GUL'LY, WILLIAM COURT (1835—). Speaker of the House of Commons since April 10, 1895. The second son of James Manby Gully, of Great Malvern, he was born in London August 29, 1835, and was educated at Trinity College, Cambridge, where he graduated M.A. in 1856. He was admitted barrister in 1860, Q.C. in 1877, and Bencher of the Inner Temple in 1879. In 1881, and again in 1885, he unsuccessfully contested Whitehaven against Mr. Cavendish-Bentinck, but since 1886 has sat in Parliament for Carlisle.

GULPER. A fish. See LYOMERI.

GULS HORNEBOOKE, gŭlz hôrn'bo̯ok, THE. A tract by Thomas Dekker (1609) giving a vivid account of the manners of Jacobean London. It is largely drawn from Dedekind's *Grobinius*, the author having changed his original intention of translating that work into one of "altering the shape and of a Dutchman fashioning a mere Englishman."

GÜMBEL, gum'bel, KARL WILHELM VON (1823-98). A German geologist, born at Dannenfels, Rhine Palatinate. He studied at the universities of Munich and Heidelberg, in 1848 undertook a practical investigation of the mining industry in the Government service at Saint Ingbert collieries in the Palatinate, and in 1851 was appointed director of the Bavarian geognostic survey. In 1861 he became an honorary professor in the University of Munich, in 1868 an instructor at the Technical High School there, in 1869 was appointed to the Bavarian mining board, and in 1879 director-in-chief of mines. A fibrous mineral, consisting of a hydrous silicate of alumina, was discovered by him in the clay-slate of Northalben (Upper Franconia, Bavaria), and is known to geology as gümbelite; while a petrified corallin is styled *Guembelina*. His publications include four volumes of the *Geognostische Beschreibung des Königreichs Bayern* (1861-91), an *Anleitung zu wissenschaftlichen Beobachtungen auf Alpenreisen* (1879-82), and a *Geognostische Karte des Königreichs Bayern* (1891).

GUMBINNEN, gōōm'bĭn-en. Capital of the district and circle of the same name in the Province of East Prussia, situated on the Pissa, a headstream of the Pregel, 68 miles east-southeast of Königsberg (Map: Prussia, K 1). It is regularly built, and produces woolens, linen and cotton goods, leather, and spirits. The trade is mostly in grain. Gumbinnen is of comparatively recent origin, having received its municipal rights from Friedrich Wilhelm I. in 1722. Population, in 1890, 12,207; in 1900, 14,003, consisting chiefly of descendants of exiled Protestants from Salzburg.

GUM'BO. See HIBISCUS.

GUMBOIL. An abscess (q.v.) near the root of a tooth, and discharging itself toward the mucous membrane of the gum. Gumboil should be treated by a free incision.

GUMBO (probably of negro origin) **SOIL.** A popular term applied in the Western United States to a class of very heavy, fine-grained soils (the grains are less than 1-100 inch in diameter), rich in soluble salts (alkali) and practically devoid of sand. Water percolates through them with difficulty, and as they are soapy and waxy when wet, the names 'waxy' and 'black waxy' are sometimes applied to them. These soils improve with cultivation, but are difficult to till. See also SOIL.

GUM FLUX. See GUMMOSIS.

GUMILLA, gōō-mē'lyä, JOSÉ (1690-1758). A Spanish missionary, born at Barcelona. He was a Jesuit, and in 1714 was sent to South America, where he was made superior of the missions on the Orinoco (1728). Soon afterwards he returned to Spain, and was appointed head of the College of Cartagena (1734), and of the University of Madrid (1738). He was a careful student of South American fauna and flora, and wrote *El Orinoco ilustrado y defendido* (1745), a very valuable work.

GUMMA. See SYPHILIS.

GUMMEL, gōō′mĕl. A town in the negro kingdom of Bornu, near the northern boundary of Nigeria, Africa, in longitude 9° 21′ E. (Map: Africa, E 3). It is of some commercial importance, and has a population of about 12,000.

GUMMERE, gŭm′mĕr-e, Francis Barton (1855—). An American scholar, born at Burlington, N. J. He graduated at Haverford College (Pa.) in 1872, at Harvard in 1875, studied in Germany at the universities of Leipzig, Berlin, Strassburg, and Freiburg, and was appointed professor of English in Haverford College. He was elected a member of the Modern Language Association of America, and in addition to contributions to the *Nation*, the *American Journal of Philology*, and other periodicals, published a valuable and widely used *Handbook of Poetics* (1885); *Germanic Origins* (1892); *Old English Ballads* (1894); and *The Beginnings of Poetry* (1901).

GUMMERSBACH, gōōm′mĕrs-bäg. Capital of the circle of the same name in the Prussian Province of Westphalia, situated near the Rhine, 30 miles northeast of Cologne (Map: Germany, B 3). Its principal industry is the manufacture of cardigan jackets, woolen goods, paper, machinery, and boilers. Population, in 1890, 10,000; in 1900, 12,525.

GUM′MIDGE, Mrs. A 'lone, lorn creetur,' in Dickens's *David Copperfield*, the widow of a sailor, and housekeeper of Mr. Peggotty's home.

GUMMING. See Gummosis.

GUMMO′SIS (from Lat. *gummi*, Gk. κόμμι, *kommi*, gum), Gumming, or Gum Flux. Any plant disease in which gum flows from the diseased area or its vicinity. There are many different diseases of this character, which have been noticed upon many species of plants, as shown below. The gum, according to Sorauer, is a combination of metagummic acid and lime. When it first appears it is soft, translucent, and gelatinous, but becomes hard, horny, and brittle upon standing, and very dark brown or nearly black. Fungi and bacteria seem associated with the gummosis of many trees, but they are perhaps secondary to some cause like insufficient nutrition, wounds, etc. Poor soil and superabundant moisture are believed by some to cause a flow of gum in some plants. On the other hand, there seems abundant evidence that diseases caused by bacteria produce gummosis of grape, olive, sugar-beet, sugar-cane, etc., and the gummy deposits noticed in the fire-blight of pears and bacterial wilt of cucurbits. A common form of gummosis of cherry and other stone fruits is caused by the fungus Ascospora beyerinckii. This fungus can live in and kill the leaves and young fruits of these trees. In the Japanese quince (*Pyrus japonica*) the tears of gum accompany the attacks of Cladosporium epiphyllum. If broken off, a canker-like wound is revealed, which may extend often to the pith of the stem. In California a gummosis of citrus trees is said to be due to the presence in the trees of the mycelium of one of the mushroom fungi. In the case of many of these diseases, pruning below the gum deposits may be of some service in checking the disease. When wet, the gum dissolves and flows to the ground, carrying spores with it. To destroy these a dressing of lime at the base of the tree is recommended. In those forms of gummosis due to errors in cultivation, restoring the necessary functions of the plants should correct the disease. For wounds of insects, etc., coat the wounded surface with tar or some similar material.

GUMPLOWICZ, gōōm-plō′vĭch, Ludwig (1838—). An Austrian political economist and sociologist. He was born at Cracow, and studied in that city and in Vienna. In 1882 he was made professor in the University of Gratz. His principal works are: *Philosophischen Staatsrecht* (1877); *Verwaltungslehre* (1882); *Der Rassenkampf* (1883); *Grundriss der Sociologie* (1885); *Das österreichische Staatsrecht* (1891); *Sociologie und Politik* (1892); *Die sociologische Staatsidee* (1892); and *Sociologische Essays* (1899). His works are characterized by profundity of research and acuteness of analysis. *Der Rassenkampf* is generally recognized as one of the most important of recent attempts to give unity to the science of sociology.

GUMRI, gōōm′rē. See Alexandropol.

GUMS. A class of organic substances mostly of vegetable origin, and composed of carbon, hydrogen, and oxygen. Many of them are completely soluble in water, forming with it a transparent mucilage; but they are all insoluble in alcohol. Chemically, the gums are amorphous carbohydrates that are transformed into sugar when heated with dilute acids. The finer varieties are used pharmaceutically for making emulsions and emollients. Other gums are used in the manufacture of confectionery, in calico-printing, in making ink, finishing cloth, etc. With reference to their chief constituents, the gums may be subdivided into the following three groups: (1) Gum arabic and similar gums, containing *arabin;* (2) gum tragacanth and similar gums, containing *bassorin;* (3) other gums, containing *cerasin*, such as cherry-gum, peach-gum, etc.

(1) *Gum arabic*, or *gum acacia*, is gathered chiefly from the Acacia Senegal, growing in Eastern Africa, and near the Senegal River in Western Africa. It is brought into the market in the form of roundish tears, varying in color from a light straw to a garnet red, and is more or less transparent; the lightest is always the best. *Picked Turkey gum* is the most esteemed variety. Gum arabic consists chiefly of arabin (arabic acid), combined with calcium, magnesium, and potassium. *Barbary* or *Morocco gum*, a dark-colored variety, has some qualities which render it valuable to confectioners. *Gum Gedda* is an inferior quality, now but seldom met with in commerce. *Gum Senegal* comes in fine, large, round tears, generally larger and of a darker color than the finest gum arabic. It is found in tropical parts of the western coast of Africa. *Gum gattie*, an Indian gum, is used as a substitute for gum arabic. Other varieties are: *Cape gum*, the Australian *wattle gum*, etc. *Wood-apple gum* is often used as an adulterant of gum arabic. The East Indian gums are dark colored, and much inferior to those produced in Africa.

(2) *Gum Tragacanth*, or gum dragon (Fr. *gomme adragante;* Ger. *Traganth*), is a gummy exudation from various species of Astragalus (natural order Leguminosæ). It is derived chiefly from the Astragalus gummifer, growing in Western Asia, and comes into the market by way of Smyrna and Constantinople. The best sort is the

flaky tragacanth of commerce; *vermicelli* and *common* tragacanth are cheaper varieties. Tragacanth is dull, translucent, horn-like, and has a white or yellowish color. It contains both arabin and bassorin; when the gum is treated with water, the portion containing arabin goes into solution, forming a mucilaginous liquid, while the bassorin remains undissolved. Tragacanth has a soothing action when applied to a sore throat. It also finds considerable application in the arts, being much valued as a stiffening material for various textile fabrics. The following gums are more or less closely allied to gum tragacanth: *Bassora gum*, which is used to adulterate tragacanth; *wood gum*, which is derived from the birch, ash, oak, willow, etc.

(3) *Cherry-tree gum* is a colorless or yellow gum used for stiffening hats. It swells with water, forming a slimy paste. In contains a considerable amount of the insoluble substance *cerasin*.

Sugar-beet gum, *Irish-moss gum*, and a few other gums contain substances which differ somewhat in their properties and reactions from the arabin, bassorin, and cerasin mentioned above. Sugar-beet gum contains pararabin; Irish-moss gum contains lichenin.

A substance named *animal gum* has been extracted from the salivary and mucous glands. It is a carbohydrate closely resembling the vegetable gums; soluble in water, insoluble in alcohol. Like the vegetable gums, it is transformed into sugar when boiled with dilute acids.

Gum Resins. These are the dried exudations of various plants. The gum resins are mixtures containing one or more gums and one or more resins. When they are rubbed with water, the gum generally dissolves, while the insoluble resin forms an emulsion. Alcohol, on the contrary, dissolves the resin, leaving an insoluble residue of gum. It thus requires both water and alcohol to dissolve a gum resin completely. The group includes: *Ammoniac*, *asafœtida*, *galbanum*, *gamboge*, *myrrh*, and *scammony*, all of which are included in the United States Pharmacopœia, and are described in special articles under their names. Other gum resins are the following:

Bdellium, which resembles myrrh, and was highly esteemed by the ancients for its medicinal properties. The Indian variety is mentioned in the Bible; the African variety is used by French druggists in making plasters.

Euphorbium, an acrid substance formerly used in medicine; it is derived from the Euphorbia officinarum, growing in Northwestern Africa.

Sagapenum, formerly used in medicine.

Gum Substitutes. These are made from wheat-starch, potato-starch, and other feculas, by baking or roasting, so as to convert the starch into dextrin. They are employed as substitutes for the real gums, which are more expensive. For some purposes, the gum substitutes are superior to the real gums.

GUMTI, gum′tē. A river of India, remarkable for its windings. It rises in a small lake in the District of Shahjehanpur in the United Provinces of Agra and Oudh, and after a southeastern course of 482 miles, enters the Ganges near Benares (Map: India, D 3). It is navigable for inland craft to Lucknow, more than 300 miles above its confluence with the Ganges.

GUM-TREE. A name applied to many very distinct trees that exude gum or resin of some kind. In the United States, one of the best known from New York to Texas is the sweet gum (*Liquidambar styraciflua*, order Hamamelideæ), sometimes called the American storax, a large, handsome tree, with deeply five- to seven-lobed smooth and shining leaves, which in autumn become brilliant scarlet. The rather fine-grained wood is used to a considerable extent for furniture, and the bark, which is deeply furrowed, is valued in domestic medicine in the treatment of dysentery. Several species of Nyssa, a genus of the order Cornaceæ, are known as gum-trees. The best known is the black or sour gum (*Nyssa multiflora*), found from Maine to Texas, a large tree with tough, close-grained wood which, since it splits with difficulty on account of its cross-grained and interlacing fibres, is valuable for hollow woodenware. Other species are common through the Southern States, where they are better known as tupelo. *Nyssa capitata*, of rather limited range in South Carolina, Georgia, and Florida, is known as the ogeechee lime from the appearance of its edible fruit. *Bursera gummifera*, of Florida, is known as gum elemi, and *Bumelia lanuginosa*, the shittimwood, indigenous from Illinois to Texas and Mexico, is locally known as gum elastic. In Australia the name gum-tree is applied with various modifications to many of the species of Eucalyptus (q.v.). *Styrax benzoin* is called gum-tree in the East Indies, and in Europe a number of other trees are similarly designated.

GUN. A heavy piece of artillery or ordnance designed for direct fire, in which it differs from howitzers and mortars, which use high-angle fire. See Artillery; Guns, Naval; Ordnance; Field Artillery; Machine Gun; Mortar; Siege Guns.

GUNBOAT. A small vessel of light draught, designed for service in harbors, rivers, and inshore waters. Modern gunboats are much larger than their prototypes. In the United States Navy the vessels of the *Yorktown* class of 1700 tons displacement are styled gunboats, though their proper designation is that of *cruiser*, for they are sea-going ships. Gunboats have always been useful auxiliaries in offensive and defensive warfare, but by themselves they have very little fighting value.

GUN-CARRIAGE. The vehicle or support by which artillery or heavy ordnance is brought into action or manœuvred. The modern gun-carriage is a result of the great improvements made in recent years, chiefly due to better mechanical design, and the introduction of pneumatic and hydraulic cylinders to check the recoil, combined with powerful springs to throw the gun back to its firing position, after recoil. For more detailed information, see Artillery; Field Artillery; Coast Artillery; Guns, Naval; Machine Guns; Mountain Artillery; Siege Guns; and Ordnance.

GUNCOTTON. A name applied to certain cellulose products of the action of nitric acid on cellulose, discovered by Schönbein in 1846. The molecular formula of cellulose (q.v.) is some unknown multiple of $C_6H_{10}O_5$, and the action of nitric acid results in the substitution of a varying number of NO_2 groups for hydrogen atoms in the doubtless complex molecule of cellulose. The

composition and chemical constitution of the resulting compounds determine their properties (e.g. the solubility in organic liquids), and upon these, in turn, depend the practical uses to which the several compounds may be applied. The higher substitution products are generally called 'guncotton,' the lower ones 'pyroxylin.'

In preparing the cellulose nitrates, purified cotton is treated with a mixture of nitric and sulphuric acids. The mixture used in the case of guncotton consists of one part by weight of nitric acid, specific gravity 1.5, and three parts of sulphuric acid, specific gravity 1.845. For every pound of cotton 12 pounds of the acid mixture are used, and the cotton is immersed and digested in it for twenty-four hours. After the acid has been removed from the cotton by wringing, the latter is pulped, washed, and compressed into blocks. The acid liquids which have been expelled from the cotton after use are found to contain 79.91 per cent. of sulphuric acid, 9.52 per cent. of nitric acid, 1.04 per cent. of tetroxide of nitrogen, and 9.65 per cent. of water. This mixture is re-worked and is used again. For pyroxylin and other of the lower cellulose nitrates weaker acids are used, according to the purpose for which the resulting product is intended.

The cellulose nitrate, known as pyrocellulose, used by the United States Navy in making smokeless powder, contains from 12.45 to 12.80 per cent. of nitrogen. Such cellulose nitrate has been made by dipping one pound of cotton (free from oil and mechanical impurities and containing about 7 per cent. of moisture) in 19 pounds of a mixture containing about 57 per cent. of sulphuric acid, 28.2 per cent. of nitric acid, and not more than 2 per cent. of nitrogen tetroxide. The acid mixture has an initial temperature of 25° C. (77° F.), and the crock containing the mixed acids and cotton is heated to 36° C. (97° F.), the action being maintained with one turning over of the cotton, for sixty minutes. After purification by wringing, washing, and steaming, to remove the acid, the nitrocellulose is freed from the water remaining in it by extraction with alcohol, and it is converted into a gelatinous mass by kneading or stirring in a Werner and Pfleiderer mixing-machine with a mixture of ethyl ether and ethyl alcohol, two parts by weight of ether and one part by weight of alcohol being used for every three parts by weight of nitrocellulose. The subsequent processes have for their object the more intimate mixing of the material and straining off of the unconverted portions, the shaping of the mass into grains. The latter still contain some of the solvent, particularly alcohol, the amount varying with the thickness of the walls. The very smallest grains contain about 0.5 per cent., the larger grains often as much as 4 per cent. of the solvent.

The pyroxylin used for the manufacture of pyroxylin plastics, such as 'celluloid,' is made by dipping cotton or tissue paper in a mixture of sulphuric acid, 66 parts; nitric acid, 17 parts; and water, 17 parts; 100 pounds of the acid mixture being used for one pound of paper, and the immersion being continued from twenty to thirty minutes at 30° C. The pyroxylin used in this art is of low nitration, containing about 10.18 per cent. of nitrogen. The pyroxylin used for collodion and in the making of varnishes contains about 11.11 per cent. of nitrogen, and is made by the use of stronger acids than those employed in the manufacture of the pyroxylin for plastics.

The perfection of the modern processes for the manufacture of guncotton are due principally to Baron von Lenk, of Austria, and Sir Frederick Abel, of England. Abel's improvement consisted chiefly in the reduction of the guncotton to a pulp by beating it in rag-engines, such as are employed in the manufacture of paper-pulp. The fibres of cotton consist of hollow, hair-like tubes. When immersed in the acid mixture, they become filled with it, just as capillary tubes of any other material would be, and cannot readily be freed from it. But the acid thus retained is capable of exercising further action on the fibres, and thus rendering the product unstable. Guncotton has thus frequently undergone spontaneous decomposition in storage. By pulping the long-staple guncotton, Abel cut the fibres into very short tubes which permitted of the acids being readily washed out with water in a poacher, and thereby insured the stability of the product. Moreover, the moist pulp can be readily molded into any desirable shape, and can be compressed to a density that may fit it best for use in military and naval mining. Thus the guncotton used for torpedoes in the United States Navy is compressed into rectangular blocks, with chamfered corners, 2.9 inches in diameter and 2 inches in height, each block being provided with a hole one-half inch in diameter lying in its vertical axis. Such blocks are obtained by first molding the wet pulp in a molding-press under a pressure of 100 pounds to the square inch, and then subjecting the molded blocks to a pressure of 6800 pounds to the square inch in a final press. Although one of the most powerful of explosive substances when fired by detonation, this military guncotton can, when damp, be shaped with tools as wood is shaped, and in the preparation of the guncotton charges for use in the heads of the very large torpedo-shells fired from the guns of the United States steamship *Vesuvius*, these compressed blocks of pulped guncotton were sawed with a fret saw and turned in lathes to shape the mass so as to conform to the particular shape of the heads of the torpedoes.

The stability of guncotton or its permanency during storage is tested by exposing it to an agreed temperature and noting its behavior. This is preferably done by the method devised by Abel, in which the guncotton is placed in a test tube which is partly immersed in the water contained in a water bath, the mouth of the test tube being closed by a cork stopper from which a piece of partly moistened test paper is suspended by means of a platinum wire. When the guncotton begins to decompose, it gives off nitrogen oxides, which are absorbed by the moisture on the test paper and react with the reagents with which the paper is covered to produce a color, and as only the lower half of the paper is moistened, the color first appears as a brown line at the point of demarcation between the wet and dry parts of the paper. In making the test the water in the bath is heated up to the agreed-upon temperature, and maintained at that temperature by means of a temperature-regulator. The test tube, filled and fitted as above described, is plunged into the water bath to the prescribed depth and a stop-watch started. A piece of paper upon which a line of the agreed depth of color has been drawn (known as the standard-tint paper) is placed beside the test

tube, and the paper within the tube is carefully watched. In order that the guncotton shall pass the test, no colored line equal in depth to that on the standard tint paper must appear on the test paper within ten minutes when the guncotton is exposed to a temperature of 73° C. (170° F.). This test is known as the Abel heat test.

Aside from the use of cellulose nitrates for guncotton for military purposes, for which object the product is finely pulped and compressed and undergoes the highest nitration possible, it is also employed in various important industrial applications. The solubility of pyroxylin in ether alcohol, which was discovered by Dr. Maynard, of Boston, in 1847 or 1848, afforded the liquid since known as collodion (q.v.), which can be used as a substitute for sticking plaster and as a vehicle for medicine. Subsequent applications of the cellulose nitrates have been the coating of photographic plates by collodion, the manufacture of celluloid (q.v.), the pyroxylin varnishes invented by Crane, and the making of artificial silk, artificial leather, and transparent films for photography.

From the returns of the last United States census it appeared that in 1900 there were ten establishments in three different States engaged in the manufacture and sale of cellulose nitrates, and that they employed $255,343 of capital and had 163 employees. There were produced 922,799 pounds of the various cellulose nitrates, having a value of $486,773, and there were consumed 691,115 pounds of cotton and 8,247,668 pounds of mixed acids. In addition there were produced and consumed in other establishments 2,739,834 pounds of cellulose nitrates, making a total product for the year of 3,662,633 pounds of cellulose nitrates.

BIBLIOGRAPHY. Consult: Munroe, *Chemistry and Explosives* (Newport Torpedo Station, 1888); Guttmann, *The Manufacture of Explosives* (New York, 1895); Wisser, *Compressed Guncotton for Military Use* (New York, 1886); Förster, *Schiesswolle in ihrer militärischen Verwendung* (Berlin, 1888); Cundill, *A Dictionary of Explosives* (London, 1895); Romocki, *Geschichte der Sprengstoffchemie, der Sprengtechnik und des Torpedowesens bis zum Beginn der neuesten Zeit* (Berlin, 1895); Parrozzani, *Del fulmicotone e del cotone pirico* (Aguila, 1884); Lubarsch, *Die chemische Prüfung des comprimierten Pyroxylins* (Berlin, 1885); Munroe and Chatard, *Report of Chemicals and Allied Products for the United States Census of 1900* (Washington, 1902); Munroe, *Index to the Literature of Explosives* (Baltimore, 1893). See CELLULOSE; EXPLOSIVES; SMOKELESS POWDER.

GUN'DAMUK'. See GANDAMAK.

GUNDOF'ERUS (Lat., from Gk. Γουνδαφόρος, *Goundaphoros;* an attempt to transliterate the Iranian name *Vindafarnā*). An Indo-Bactrian King, who is said in early Christian legends to have been converted by the Apostle Thomas, the missionary to India. In the Sanskrit inscription of Takht-i-Bahi, of A.D. 44, and on his coins, the King is called Guduphara, or Gadaphara, Hyndopherres, etc. In later Christian legends he appears, under the corrupted name Gathaspar or Gaspar, as the third of the Magi who worshiped the Christ-child at Bethlehem. Consult Justi, *Iranischesnamenbuch* (Marburg, 1895).

GUNDUK'. See GANDAK.

GUN'DULF. The reputed founder of an heretical sect in Artois, the Bishopric of Liège, and elsewhere, in the eleventh century. Of Gundulf himself nothing is known. In 1025 a company of his fellows was arrested by Gerhard, Bishop of Cambrai and Arras, and brought to trial. According to the rules which they avowed, they had forsaken the world, were striving to keep the flesh in subjection, to support themselves by their industry, to be honest in their dealings, and to love all who were willing to join them. In their assemblies they were accustomed to pray and to wash one another's feet. Gerhard, however, charged them with rejecting the sacraments, the Roman Catholic Church, the Pope's supremacy, the hierarchical system, and all clergy whatever, and teaching that the consecrated elements of the Lord's Supper were nothing more than what they appeared to be; that marriage was to be avoided, that church buildings and altars were not holy, and that crosses, crucifixes, and images tended to idolatry. At length, under the combined influence of the Bishop's arguments and of torture, they agreed to recant their errors. The acts of the synod are the only source from which knowledge of this sect can be obtained, and after the trial neither Gundulf nor his followers can be traced. The acts are best edited by Federicq, *Corpus Documentorum Inquisitionis Neerlandicæ* (Ghent, 1889). Consult Döllinger, *Beiträge zur Sektengeschichte des Mittelalters* (Munich, 1890).

GUNDULIĆ, gun'dōō-lĕch, IVAN (1588-1638). The most celebrated Illyrian poet of earlier times. He was born in Ragusa, on the coast of Dalmatia, a meeting-place of Italian and South Slavic culture, and received the best education obtainable at the time, studying philosophy, jurisprudence, and classical and Latin literature. His scholarly attainments secured him various official posts at an early age, and at one time he occupied the highest office, that of rector of the Republic of Ragusa. A translation of Tasso's *Jerusalem Delivered* was followed by original poetical works, lyric, epic, and dramatic. His greatest work is the heroic epic *Osman*, in twenty cantos, describing the campaign between the Poles and the Turks around Khotin in 1621. The poem was first published in 1626, and since then has been often republished. A late edition for schools, with a commentary, is by Broz (Agram, 1887). Other works of Gundulić are the elegy *Tears of the Lost Son*, and the dramas *Cleopatra*, *Dubravka*, *Prosperpina*, and *Ariadne*, to mention only a few of the many that laid the foundations of Slavic drama at the new theatre of Ragusa. His collected works were published in 1877 by the Agram Academy in volume ix. of *Ancient Horvatian Writings*. Consult: Appendini, *Vita di G. Gondola* (Gundulić) (Ragusa, 1828); Jensen, *Gundulić und sein Osman* (Gotenburg, 1900).

GUNGL, gōōngl', JOSEPH (1810-89). An Hungarian composer and conductor, born at Zsámbék, in Hungary. He became an oboist in, and subsequently bandmaster of, the Fourth Austrian Artillery Regiment. Previously he had gained considerable experience as a teacher, but it was his work with this organization, both as soloist and conductor, that gained for him public recognition. During the eight years of his leadership the band attained a European reputation and

made many tours, Gungl's compositions being the most popular features of the programmes presented. His Berlin Orchestra was established in 1843, with which organization he made a tour of the United States six years later. His other positions were: Royal Musical Director (1850), and Bandmaster of the Twenty-third Regiment of Infantry, stationed at Brünn (1858). From this time on, most of his life was employed in concert tours. He has left about four hundred compositions, for the most part waltzes, many of which have vied in popularity and effectiveness with the waltzes of Strauss. He died at Weimar.

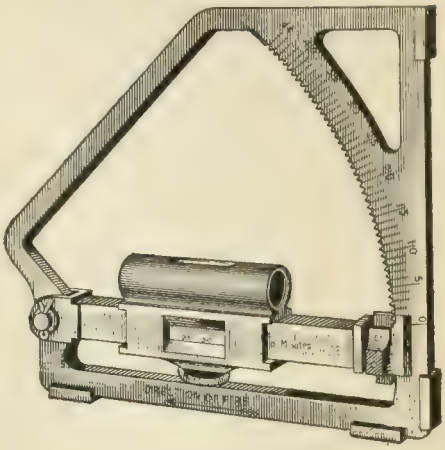
GUNMAKING, GUN-FACTORIES. See ORDNANCE; SMALL ARMS; SHOTGUN.

GUN-METAL, or GUN BRONZE. See ALLOY.

GUNNEL, or BUTTERFISH. A kind of blenny (*Pholis gunnellus*), which has an eel-shaped body six or eight inches long, and occurs abundantly along rocky shores, among algæ, on both sides of the North Atlantic south to Long Island Sound, and on the coast of France. It is deep olive in color, with a row of dark spots on the back, and is remarkable for the quantity and thickness of the mucous secretion with which it is covered. There are other species, all shore fishes of the northern seas.

GUNNER. In military usage throughout the world, private soldiers of the various branches of the artillery service are described as gunners. In field batteries the soldiers who drive and have charge of the horses of the battery are usually termed 'drivers.' In the United States Army the cannoneers are the non-commissioned officers and men who ride on the field piece and limber, and who work the guns. The grade of first or second class gunner is open to non-commissioned officers and men who qualify by examination. The grade carries with it an increased rate of pay, the soldier being distinguished by a decoration in the form of a projectile of scarlet cloth worn on the sleeve of his coat. (See MILITARY INSIGNIA.) In the British Army there is a warrant rank in the garrison artillery known as master gunner, but it is gradually becoming obsolete. In the naval service the gunner is a warrant officer who, under the ordnance officer, has charge of the ship's ordnance, magazines, etc. He is usually an ex-apprentice with a good record, appointed after examination upon the recommendation of the commanding officers. Gunners and boatswains (q.v.) to the number of six annually are eligible for commissions in the line of the navy if suitably recommended and after passing the requisite examination. As an assistant to the gunner, there is a petty officer, known as the gunner's mate. See *Navy* under UNITED STATES.

GUNNER'S QUADRANT. A mechanical instrument used in the artillery service, either to give the elevation directly or to verify the angles obtained by ordinary sights on every kind of gun and mortar. In the 3.6-inch and 7-inch mortars two seats for the feet of the quadrant are squared off on the upper side of the piece in rear of the trunnions. The quadrant is applied to the breech of the gun, the face of the muzzle, to an element of the bore, or to an element of the exterior surface where it is parallel to the axis of the bore, as may be most convenient. It is composed of two main parts, the body carrying the graduated arc, and the movable arm carrying the index and the level. The movable arm also carries a graduation in minutes from 0 to 60 degrees; and the level, which is capable of a longitudinal movement along the arm, carries a second index for reading this scale. Degrees are read upon the graduated arm upon the body, minutes by the sliding level and scale on the movable arm. The principle by which the



GUNNER'S QUADRANT.

scale of this arm is constructed to read to minutes is as follows: The arm represents a portion of the arc of a circle, which in this case has a radius of 113.45 inches. The level is a chord of this circle, and its index is at its middle point. See GUNNERY.

GUNNERY. The science and art of handling guns. The science of handling guns consists of exterior and interior ballistics (q.v.) and the discussion of problems arising in connection therewith. The art of handling guns includes drill and target practice and the practical problems and other matters connected with them.

To render a gun effective, four points are to be considered: (1) Safety, (2) accuracy, (3) destructive effect, (4) speed of fire. Safety is necessary, as the knowledge, or even the suspicion, of its unsafeness, will demoralize the men who handle it, in addition to which is to be considered the injury it may do if it gives way. The greatest dangers to be apprehended from modern guns are the premature explosion of the charge; a hang-fire (q.v.) and the opening of the breech before explosion of the charge; the jamming of a projectile in the bore and the blowing off of the muzzle; the use of bad or improper powder, or of proper powder in too great quantities; weakness in the mount. No other causes should render a well-made modern gun dangerous to its crew. Premature explosion of the charge cannot absolutely be prevented, but it is now rendered very unlikely by automatic attachments to the breech mechanism which make it impossible to fire the primer—whether electric or percussion—before the breech is fully closed and locked. The remaining source of danger is the high temperature of a gun when heated by rapid firing; the condition of affairs in which a gun becomes so hot that it will set fire to the charge is not im-

possible, but should be unusual. Turret guns may be cooled by the washing-out hose, which is always handy, and the other guns by the fire hose if necessary. Hang-fires (q.v.) are chiefly dangerous in small pieces, and most of these are automatic or semi-automatic, and will not open until the charge is exploded. The jamming of the projectile may occur in spite of all ordinary precautions; but the damage is usually confined to the part of the gun outside of the ship, and therefore will not injure the members of the crew. The use of bad (i.e. deteriorated) powder is very nearly overcome by the employment of a reliable kind of powder and careful inspection and stowage. As far as weakness of mount is concerned, there is no excuse for a mount to be so weak as to render firing dangerous to the crew.

Having secured a gun and mount which is safe, we should next desire accuracy. In a field gun the causes of inaccuracy are: (1) Variations in the angle of sight; (2) drift (due to rotation of the projectile); (3) wind; (4) jump; (5) axis of trunnions not in the horizontal plane; (6) variations in velocity of projectile due to inequality of the powder; (7) incorrect setting of the sights, due to error in the supposed distance of the object fired at; (8) personal error of the gun-pointer, which makes him habitually take too fine or too coarse a sight, etc.; (9) state of the atmosphere (height of barometer and thermometer and hygrometric conditions); (10) effect of strong or defective light upon the sights, etc. In addition to these, guns aboard ship are subject to errors due to (11) horizontal movement of the ship and of the enemy; (12) rolling and pitching of the ship. As ships' guns have all the errors of field guns and some very important ones of their own, we need consider them only. The angle of sight is the elevation of the object fired at above the horizontal plane through the gun; the error due to this is usually trifling. This follows from the principle of the 'rigidity of the trajectory,' which may be briefly explained by saying that the range of a gun upon any plane passing through the axis of the trunnions of a gun is practically the same as upon the horizontal plane, if the angle of elevation of the gun above this plane is the same as its elevation above the horizontal; provided always that the angle the inclined plane makes with the horizontal is a small one. The drift of a projectile is very considerable; but it is likewise very regular in amount, and this is definitely known and allowed for by inclining the rear sight-bar to the left through an angle of 2½ to 3 degrees, or dropping the left end of the axis of a telescope sight until it is inclined the same amount.

The correction for the effect of the wind must always be left to the individual judgment of the gun-pointer; tables showing the deviations of projectiles due to winds of varying force are prepared, and these are used to train the gun-pointer in making allowances. Jump is the vertical error due to the upward throw of the gun as it is fired. It is very nearly corrected by an allowance in marking the sight-bars and drums. If the axis of the trunnions of a gun are not parallel to the horizontal plane, the angularity of the sight-bar or telescope is interfered with. The error due to this cause is usually small, except at long ranges, and difficult to correct. It should be avoided as far as possible by firing when the axis of the trunnions is nearly horizontal. The error due to variations in velocity caused by inequality of powder can be corrected only by testing the powder at intervals, and by careful attention to its stowage, especially as to the preservation of low and regular temperatures in the magazines. The error is usually small. The error caused by incorrect setting of sights due to a mistake in the supposed distance of the object is the greatest of all the errors of firing. In the days when guns fired slowly and the fall of the projectiles could be noted, the range could be increased or decreased as was seen to be desirable. But in modern ships the guns are so numerous and fire so rapidly that the fall of any particular projectile cannot be observed with certainty; and this is particularly the case when more than one ship is engaged on each side.

It is necessary, therefore, to depend upon some form of range-finder (q.v.). No perfectly satisfactory range-finder has yet been produced, but acceptable ones are beginning to appear. The error due to incorrectly assumed distance of the object is much reduced as the velocity of projectiles is increased, provided the increased velocity is not obtained by lightening the projectile, because the trajectory, or line of flight of the projectile, becomes nearer a straight horizontal line as the velocity increases. In the following figure, let A be the point at which the gun is lo-

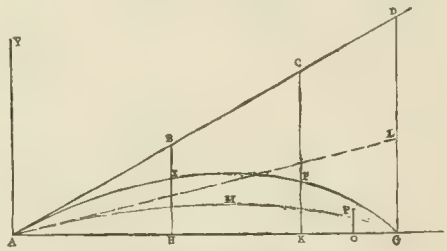


DIAGRAM SHOWING TRAJECTORY.

cated, and A B C be a prolongation of the axis of the bore. Let B be the point at which the projectile would be in 1 second, C in 2 seconds, and D in 3 seconds, provided gravity did not act. Then the actual positions will be E, F, and G; and B E, C F, and D G are the distances the projectile would fall, if acted on by gravity alone in 1, 2, and 3 seconds. For convenience we have assumed that the projectile strikes the water at the end of three seconds. Since we have from physics the general formula $S = \frac{1}{2}gt^2$, in which S is the distance in feet a body falls in t seconds and g is the gravity acceleration, or 32.2 feet, we can at once determine the shape of the curve A E F G if we know the time it takes for the projectile to move from A to E, from E to F, and from F to G. In the case assumed, $S_1 = BE = \frac{32.2}{2}(1)^2 = 16.1$ feet; $S_2 = CF = \frac{32.2}{2}(2)^2 = 64.4$; and $S_3 = DG = \frac{32.2}{2}(3)^2 = 144.9$. The formula $S = \frac{1}{2}gt^2$ is only true *in vacuo;* but since projectiles are very dense, it is approximately true in air when t is small. If the velocity of the projectile were doubled, the necessary elevation, in order to hit an object at G, would be represented by the line A L, in which L G is the distance the projectile would fall in 1.5 seconds, or 36.2 feet; the trajectory would

then be represented by the line A M G, which is very much nearer the horizontal plane than the curve A E F G. So that if the object fired at be at O instead of at G, as supposed, and if its height is O P, the low-velocity shot will miss it, while the high-velocity one will hit it, notwithstanding the error in the assumed range. The difficulty of obtaining the correct range is enhanced by the movements of the ship firing and the one fired at, the combined movement constantly changing the distance, sometimes very rapidly. It is necessary, therefore, to have the range transmitted to the gun as quickly as possible after being determined by the range-finder. This renders it desirable to have many range-finders—one for every group of guns, if possible. The reason why so few hits are made in a naval battle in comparison to the shots fired is largely due to the uncertainty of range. At the naval action off Santiago the ships were all moving quickly, and the ranges were changing with great rapidity; the result was that the United States ships made less than 10 per cent. of hits, while the Spaniards probably made not much over 1 per cent. In both fleets the smoke interfered very much with the shooting; but the greatest source of error was the uncertain range.

The personal error of the gun-pointer, which tends to make him habitually shoot high or low, or too soon, or too late, can only be corrected by practice at known ranges. The state of the atmosphere affects the range, but this need not be considered. The horizontal movement of ships has already been referred to. If from a ship which is not moving, the centre of a vessel 200 feet long moving at the rate of 20 feet per second (12 knots per hour) is fired at, the shot will fall astern of her if she is so far away that it takes more than 5 seconds for the projectile to reach her. If the firing ship is moving in the opposite direction at 12 knots, the shot will miss her if the projectile only takes 2.5 seconds. The allowance is the same sort as that made when shooting at birds on the wing or at moving animals; but it must be very much more carefully estimated. The rolling and pitching of a ship are fruitful sources of error in firing, particularly with poorly trained gun-pointers. Good training and plenty of target practice reduce the errors in a great measure, and nearly eliminate them when the angle of roll or pitch is small. The greatest effect of rolling through small angles is seen in the decreased speed of fire, for the gun-pointer of a heavy gun must 'wait for the roll' before he can fire, and if the gun is not trained correctly it will not be on the target when the sights roll past it. For this reason, and because the motion is slower then, it is desirable to fire near the end of the roll; this must always be an approximate rule, as one roll may be through an angle of 5 degrees and the next only through 2 or 3. Guns of 7-inch calibre and less are now fitted with elevating gear which permits them to be kept on the target throughout moderate rolls.

The destructive effect of gun-fire depends upon the character of the projectile and of the ship. Against unarmored ships shells with comparatively thin walls, but containing a large bursting charge, are used. Against armored ships armor-piercing projectiles are used, if the armor is too thick to be perforated by heavy common shell. To secure greater penetration in hard-faced armor, soft steel caps are placed on shell which are to be used against armor. (See ARMOR PLATE; also PROJECTILES.) At close range it is possible to select a particular part of a ship for attack; but close ranges are likely to be the exception in naval battles, and many will doubtless be decided before close range is reached. At long range the probability of hitting at all is not large; therefore it is not advisable to reduce this probability by attempting to strike particular parts of the enemy's vessel; all projectiles should therefore be fired to hit the centre of the target it presents. The unavoidable errors will cause the projectiles to deviate more or less from this point, but many will hit in places where they will do much damage. Large armor-piercing shells usually have no bursting charges, because gunpowder is not strong enough to burst their thick walls, and very few high-power explosives will stand the shock and heat engendered by passing through armor. There are a few powerful explosives that can be fired through armor; but they are so insensitive that they will not explode of themselves when beyond the armor, and it is difficult to construct a fuze which will explode them that will not be ignited too soon. The most promising explosives for loading armor-piercing shells are perhaps jovite and maximite; shells filled with each of these compositions have been fired through armor and satisfactorily exploded beyond. For common shell and armor-piercers not exceeding 6 inches in calibre, fine black gunpowder is used as the bursting charge. It is safer than any high-power explosive, and can be satisfactorily exploded. Moreover, it breaks the shell into a sufficient number of pieces, and its incendiary effect is believed to be greater than that of any high-power explosive. The latter breaks the shell up into very small pieces, which are less destructive than larger ones. The damage caused by the explosion of a shell containing a bursting charge made up of a high-power explosive is very great in the immediate vicinity of the explosioin, but the area of destruction is generally less than from shells filled with gunpowder.

In former days, if a ship could cross the bow or stern of an enemy and deliver a raking fire, it often caused sufficient destruction of life and material to decide the fight, while the vessel raked could bring few or no guns to bear in return. The value of a raking position has much decreased, and is likely to be further lessened. Recent armored ships are well protected against raking fire, and a very large proportion of their batteries is available against an enemy crossing bow or stern. The different plans upon which the batteries of modern ships are arranged will cause them to try to select such positions with reference to the enemy as will enable them to use their gun power to the best effect, while that of the enemy is less favorably situated; but if the enemy is sufficiently alert, not even the possession of superior speed will insure that this can be done. The direction of the enemy from a ship is called the angle of presentment, and it is usually measured from the beam; but as regards the striking of shell, the angle of presentment is the angle between the path of the projectile and a normal line or perpendicular to the surface hit. In both old and modern ships the broadside fire is greater than the bow or stern fire; but in modern ships the bow and stern fire is usually strong. With the exception of

one or two guns, the broadside battery is generally available in any direction from 45 or 50 degrees forward of the beam to a point at an equal angle abaft it. The advantage of giving the widest practicable arcs of fire (the angle through which the gun can be trained or fired) is easily seen, for it may result in giving a decisive advantage, and it is carefully sought when the plans of a ship are made. It was formerly the custom to fire at the enemy's water-line, because hits there were most serious, and if the shell fell short it would usually strike the ship after making a 'ricochet' (i.e. glancing from the surface); while if it went too high it might cause no damage whatever. The ricochet of spherical projectiles was usually in the line of fire; but elongated rifled projectiles do not continue on the course after striking the water; they usually turn to the right, often at a considerable angle, and sometimes shoot sharply upward to a considerable height. The present practice is therefore to aim at the middle of the target the enemy presents, both as regards length and height. In defense against torpedo boats, the smaller guns of ships are chiefly relied upon; but as a result of experiment and experience in war it is found that the very small pieces are of little use. They are inaccurate, owing to the curved path of the projectile, which loses its velocity more rapidly than a large one, while it is too small to disable a modern torpedo boat. Guns using projectiles weighing from 6 to 14 pounds are the ones chiefly relied upon; but it is doubtful if even these are quite adequate, and it is certain that shrapnel from 5-inch, 6-inch, 7-inch, and 8-inch would be very useful.

The last point to consider about a gun is speed of fire. As has already been said, speed is last to be considered, not because of lack of importance, but because a gun must be safe, and its fire accurate and destructive, or speed is useless. A high rate of fire can be attained only by means of a properly designed mount and breech mechanism, adequate ammunition supply, a reasonably steady gun-platform, and a well-trained crew. The mount must be strong, and admit of rapid and easy training and elevation. The breech mechanism must be simple, effective, strong, and quick working. No delay must occur through inadequacy of the ammunition supply, and there must be sufficient room for the crew to carry on the operations of loading in the most expeditious manner. The speed of fire from turrets is generally much reduced for lack of room, particularly in turrets mounting guns of 8-inch calibre or less. More, perhaps, depends upon a suitable form of drill than upon anything else. Exact adherence to prescribed forms should not be required; a drill manual should be a general guide, and not a plan to which exact compliance is required, if it can be shown that greater speed can be obtained by a variation of it. In preparing a plan of drill, the fact must be kept in view that the greatest effective speed is attained when the work is so divided that every man is working all the time in a manner which will not interfere with, but facilitate, the work of others; and no man should be called upon to do what another can do better, if that can be avoided. Such a division of duty is usually impossible; but it is the end to be sought and approximated to. Orders and all talking should be done away with, and the different operations going on at the same time made to fit in with each other in a way to make orders superfluous.

Having by experiment developed the best drill, so far as the officer in charge of it is able to judge, the men should be exercised at their duties until their movements have become nearly mechanical. The stage is now reached at which target practice must be begun. In the United States Navy the gun-firers for the principal guns nearly all receive a preliminary training in the gunnery ships, and hold the ratings of gun captain (chief, or first or second class). In the United States service the expenditure of time and ammunition for target practice is greater than in any foreign navy. There are seven practices a year in which full-calibre ammunition is used; six sea practices in which no attempt is made to obtain an exact record of the firing beyond what is necessary for purposes of immediate instruction and the information of the gun-firer, so that he can correct his errors; and one record practice in which the exact records of the firing are sought, in order to furnish the Navy Department with information as to the efficiency of the men who operate the guns. The expenditure of ammunition per gun per year is fixed as follows: 10, 12, and 13 inch guns, 12 rounds; 8 inch, 18 rounds; 7-inch, none yet in service; 4, 4.7, 5, and 6 inch guns, 24 rounds; 3 inch, 36 rounds; 3-inch field gun, 18 rounds; 1, 3, and 6 pounders, 72 rounds; Gatlings and Colt automatic guns, 1100 rounds. In order to give a greater amount of practice than is afforded by any reasonable expenditure of the ordinary ammunition, the sub-calibre principle is used. This consists of a small barrel or gun securely clamped to the outside of a large gun, or inserted in disks and then placed in the inside of the gun, where it is firmly held in position. The gun-firer trains and elevates the large gun, using its sights, but setting the elevation in accordance with a table which adapts them to the various ranges of the small piece. So far as the training of the gun-firer is concerned, this is almost as good as firing large charges, and the reduction in expense is 90 to 99 per cent. The sub-calibre practices are held about once a month, and the amount of ammunition which may be expended is left to the discretion of the commanding officer of the ship. The targets used are made of canvas, supported by a framework or pole; the common one, supported by a pole, is triangular; but a rectangular one will probably be used in future for certain record practices. In addition to target practice, gun-firers are practiced at aiming with a device which records the direction of the sights when the firing button is pressed, and which keeps the little target, which is at the muzzle of the gun, in motion in a manner to simulate the apparent movement of a real target past the sights when the ship rolls. For training on shore, an oscillating or rolling platform has been designed which gives the gun motion similar to that which it has on a rolling ship.

For further information on the subject, consult: Glennon, *Accuracy and Probability of Fire* (Baltimore, 1888); id., *Interior Ballistics* (Baltimore, 1894); Ingersoll, *Text-Book of Ordnance and Gunnery* (Annapolis, 1899); id., *Exterior Ballistics* (Baltimore, 1893); Bruff, *Text-Book of Ordnance and Gunnery* (New York, 1896); *Proceedings of United States Naval Institute* (Annapolis, current); *Journal of the United*

States Artillery (Fort Munroe, Va., current); *Annual Reports of the Office of Naval Intelligence*, particularly that for 1899 (Washington). See ARTILLERY; BALLISTICS; COAST ARTILLERY; EXPLOSIVES; FIELD ARTILLERY; GUNS, NAVAL; GUNPOWDER; ORDNANCE; PROJECTILES; etc.

GUNNY (Hind. *ganni*, Beng. *gōna*, *gōni*, from Skt. *gōni*, sack, probably originally hide, cf. Prak. *gōṇa*, ox; connected with Skt, *gāu*, Gk. *βοῦς*, *bous*, ox, Eng. *cow*). A coarse kind of cloth or sacking, manufactured in India, chiefly in Bengal, whence it is largely exported to other parts of the world. The fibre of which the cloth is made is chiefly that of the same species of *corchorus* which yields the jute (q.v.) of commerce, although it is made in Bombay and Madras to some extent from sunn-hemp. Enormous quantities are annually exported to China, Australia, and other countries. It is partly made up into bags in Bengal, partly exported as gunny *chuts* or *chuttees*, pieces of size suitable for being immediately made up into bags. The manufacture of these bags was at one time the great domestic industry of all the populous eastern districts of lower Bengal, pervading all classes, and giving occupation to men, women, and children. At present, however, the bags are chiefly made in large steam factories. Gunny, both cloth and bags, is also manufactured in large quantities in Dundee, Scotland. (See JUTE.) There are few articles of commerce so widely diffused over the globe as the Indian gunny bag, being used, as it is, for a covering for large packages of all kinds, including cotton-bales, and bags for holding wheat, pepper, rice, coffee, and many other kinds of produce.

GUN-PENDULUM. See BALLISTICS.

GUNPOWDER. An explosive mixture, consisting of potassium nitrate, sulphur, and charcoal, used for military purposes, in firearms, and for blasting. For use with cannon and small arms, and for high-grade sporting rifles and shotguns, gunpowder is being rapidly superseded, and its place is being taken by the more recent smokeless powders (q.v.). There are, however, several important uses to which it is now put, the extent of which may be appreciated when it is stated that in 1900 the production of black gunpowder in the United States was valued at $1,452,377. It is employed as a priming charge in firing smokeless powder, and must be used in the older types of rifles and shotguns still owned throughout the United States. It is also necessary in the manufacture of fuzes and fireworks, and is much used for saluting, as it is far less expensive and is quite as satisfactory for the purpose as the more modern smokeless powders.

The origin of gunpowder is involved in considerable uncertainty, but it is believed that the mixture and its characteristic properties have long been known, even before its use to propel a projectile from some form of artillery. There is evidence that the recipe for making gunpowder was in the hands of some of the alchemists of the thirteenth century, and on the strength of passages in the works of Roger Bacon, he is often spoken of as its inventor. In his *De Secretis Operibus Artis et Naturæ et de Nullitate Magiæ* (1270) he gives the following directions for making gunpowder: "Mix together saltpetre with lura nop cum ubre and sulphur, and you will make thunder and lightning, if you know the mode of mixing." The mysterious 'lura nop cum ubre,' after the fashion of the time, was merely a transposition of the letters of the words *carbonum pulvere*, or charcoal. The discovery of gunpowder is also assigned to Berthold Schwartz, by whom it was mentioned in 1328. In addition to these references there are other quotations from mediæval writers bearing more or less on the subject, and also numberless traditions which confer on the ancients, and more especially the Eastern nations, the honor of this important discovery. Such legends go back even to the time of Alexander the Great, and it was asserted that he refused to attack the Oxydracæ, a race which occupied the country between the Hyphasis and the Ganges, because they "lived under the protection of the gods, and overthrew their enemies with thunder and lightning which they shot forth from their walls." This would seem to corroborate the theory that gunpowder was well known in China many centuries before its first appearance in Europe, and that it gradually worked its way westward.

Passing now to the realm of fact, we know that by the time of the battle of Crécy (1346) cannons in which gunpowder was used as the propellant were well known, and from that time as firearms were developed the amount of gunpowder consumed increased. Although its use rapidly extended, nevertheless its improvement then and since took place at a very slow rate. Gunpowder was at one time very generally styled 'meal powder' on account of its fineness of grain and the intimate mixture of its ingredients. Even in the early days of its use it was divided into different qualities, and one William Bourne, writing on gunpowder in 1587, makes a distinction between *serpentine* and *corne powder*, the latter being the form known to-day. Serpentine powder, according to Sir Henry Manwaring (*Seaman's Dictionary*, 1644), was never used at sea. He says that the cannon-powder of that date was not very strong, while the musket-powder was the finest, strongest, and best that could be procured. William Bourne, to whose work reference has already been made, speaks of a gunpowder commonly made by the 'Bours in Germanie,' which was very irregular in its quality, and had to be judged by its taste, color, and the rapidity with which it burned, the amount necessary for a charge being gauged by such a test. He advocates the use of a *cartridge* for the larger guns on shipboard in order to prevent the frequent explosions due to scattered powder. The difficulty of obtaining powder of an even quality persisted until the middle of the nineteenth century, and while the numerous wars made its manufacture necessary on a large scale, yet it was not until the end of the eighteenth century that any substantial improvements in apparatus or machinery were effected.

Gunpowder was made even before the Revolutionary War in the United States with crude machinery which consisted mainly of stamp mills having mortars and pestles of wood and bronze, in which the materials were reduced to powder and thoroughly mixed. The powder thus obtained was coarse and uneven, and the manufacture was attended with great danger. In the eighteenth century the French Government gunpowder, which was prepared under the direction of the famous chemist Lavoisier, attained considerable reputation for high quality, and it was

in France that the practice of pulverizing and mixing the separate materials in wheel mills was first employed. This method was invented by Cossigny in 1787, and in 1791 a revolving drum was first used for pulverizing, and the wheel mill reserved for mixing and incorporating materials. Improved methods and apparatus were brought to the United States by Dupont, a student of Lavoisier, and the famous works bearing his name at Wilmington, Del., were founded in 1802. In 1856 these works undertook the manufacture of blasting-powder, substituting the nitrate of sodium for that of potassium, and in 1868 the method previously suggested by Longchamps, Anthon, and Kuhlman, of obtaining the potassium nitrate from sodium nitrate and potassium chloride, was adopted. About 1860 General Rodman of the United States Army determined to make powder of larger sized grains, which consequently was slower burning, and enabled the Ordnance Department to construct guns of larger calibre. From this discovery resulted powders of variously shaped grains, generally symmetrical, and with perforations. By changing the nature of the carbon constituent, and using brown charcoal as described below, the gunpowder was rendered still slower burning, and in that form, more or less improved, has been brought down to the present.

Manufacture. In the manufacture of gunpowder great care is necessary, especially in the selection of the ingredients. The potassium nitrate, or nitre, as obtained commercially, contains potassium and sodium chlorides and sulphates, sand, and organic matter amounting to nearly five per cent. For the removal of these impurities the potassium nitrate is dissolved in hot water, and after boiling the solution is filtered through bags of coarse cloth into crystallizing vessels, where it is continually agitated while cooling, so that fine crystals may be formed. The crystals are then washed in distilled water, and while still moist are stored in bins for use. For the making of the charcoal small wood of about 10 years' growth is preferred. Alder and willow are mostly used in the United States and Great Britain, while in France dogwood is preferred, and in Germany the willow, alder, and dogwood are employed. The wood should be straight, perfectly sound, entirely free from bark, and felled during the spring of the year when its moisture is at its maximum. The carbonization is accomplished in cast-iron retorts set in bricks, and the time of burning varies from three to five hours, according to the nature of the powder for which the charcoal is desired, and at a sufficiently high temperature to drive off all volatile matter.

After cooling, the charcoal is carefully hand-picked, and then ground to powder in a mill. The sulphur employed is usually the best commercial article, but this still contains from four to six per cent. of gangue. The sulphur is purified by distillation in a large iron retort, and the sublimed sulphur received in a condenser, from which it is removed in the liquid form and cast into moist wooden molds. When thoroughly cold the sulphur is broken up into large lumps and finely ground to powder. The ground ingredients are carefully weighed, and the proper proportions mixed in a cylindrical drum of gun-metal or copper in charges of 50 pounds and upward. The mixture is then hand-sifted to remove foreign substances, and again mixed in an incorporating mill, in which, by means of distilled water, the charge is kept sufficiently moist to prevent its scattering as dust. This operation is continued for several hours, and the mill-cake is then reduced to meal by passing through rollers. The meal is then pressed into cakes by a hydraulic press, and the resulting press-cake broken into pieces of different sizes, according to the variety of powder which it is desired to produce. A series of rollers next converts the press-cake into grains, which are rough and porous on the surface, and very angular in shape. It is freed from dust by placing it in revolving reels, and then glazed by causing the grains to rub against each other in revolving wooden barrels. The final operation, called *drying*, consists in heating the glazed powder in large chambers at a temperature of from 52° to 54° C. (126° to 129° F.) for twenty-four hours. 'Pebble,' 'prismatic,' and similar names were given to forms of military powders that were used especially for artillery, and were made essentially as just described, except that the press-cake was cut into the shapes indicated by their names. (See Explosives.) The black powder once used for military purposes by the United States, Great Britain, Russia, Sweden, Italy, and France, consists of potassium nitrate 75 parts, charcoal 15 parts, and sulphur 10 parts. Other nations used slightly different proportions, ranging from potassium nitrate 77 parts down to 61.5 parts. The sulphur is the most constant of the ingredients, while the charcoal varies from 23 to 12.5 parts.

Brown or cocoa powder received its name from the color of charcoal used. It consisted of about the following proportions in the dried powder of the usual ingredients: Nitre 79 per cent., sulphur 3 per cent., and charcoal 18 per cent., although when in actual use it contained about 2 per cent. of moisture. The charcoal used was a lightly baked material, and the percentage of carbon that it contained was therefore but slightly higher than that of the wood or straw from which it was made. This variety of gunpowder found its chief use in heavy breech-loading guns in the forms of hexagonal prisms. The rate of combustion of the brown powder is slower than that of the black, and therefore for equal muzzle velocities of the projectile it produces less pressure in the powder-chamber of the gun than black powder; also it yields a thinner smoke than the latter. This variety of powder gives on explosion a greater quantity of heat, and a smaller volume of permanent gases than does an equal weight of black powder. Brown powder has been displaced by smokeless powder (q.v.) and other high explosives. See Explosives.

Mining or blasting powder, which is used for blasting purposes (see Blasting), usually has a lower amount of potassium nitrate than military powder, so as to make it slow burning, and the proportions are from potassium nitrate 70 parts, sulphur 18 parts, and charcoal 12 parts, to potassium nitrate 62 parts, sulphur 20 parts, and charcoal 18 parts. The manufacture of blasting-powder became an important industry in the United States when the construction of canals and railways and mining operations began to be undertaken on a large scale. With the increased demand for blasting-powder, which origi-

nally did not differ from ordinary powder, it was found necessary to make a less expensive substance, and accordingly it was found by L. Dupont of Wilmington in 1857 that sodium nitrate or Chilean saltpetre could be substituted for the far more costly potassium nitrate or India saltpetre. As a result of this discovery the manufacture of blasting-powder has attained considerable importance, and in 1900 there were 37 different establishments in 13 different States engaged in this industry. These factories represented $4,900,485 capital, and their output in 1900 was 97,744,237 pounds of blasting-powder, valued at $3,880,910.

Gunpowder, when of good quality, should have a specific gravity between 1.50 and 1.85. It explodes at about 313° C. (595° F.), and when ignited on a piece of white paper should burn away rapidly, leaving no residue. If black spots are found they indicate an excess of charcoal, or imperfect mixture, while yellow spots show excess of sulphur. Many studies have been made of the products of combustion of gunpowder, and the results obtained seem to show that the gases formed are, in proportions varying according to the quality of the powder, as follows: Carbon monoxide, carbon dioxide, nitrogen, hydrogen sulphide, marsh gas, hydrogen, and oxygen. The temperature produced by the explosion of gunpowder is estimated at from 2100° to 2200° C. (3812° to 3992° F.), according to the quality of the powder; and the quantity of heat evolved in gram-degree units ranges from 837 down to 518.8.

The production and value of gunpowder, including blasting-powder, produced in the United States is given by decades in the following table from the Twelfth United States Census:

YEAR	Number of establishments	Capital	Average number of wage-earners	Product	
				Pounds	Value
1840	137	$875,875	496	8,977,348	
1850	54	1,179,223	579	.	$1,590,332
1860	58	2,305,700	747	.	3,223,090
1870	33	4,060,400	939	. .	4,011,839
1880	33	4,983,560	1,011	.	3,348,941
1890	37	9,609,975	1,622	95,019,174	6,740,099
1900	47	8,297,773	1,708	123,314,103	5,310,351*

* Of the 1900 production 97,744,237 pounds, valued at $3,880,910, were blasting-powder, and 25,648,804 pounds, valued at $1,452,377, were black powder produced by 10 different establishments.

BIBLIOGRAPHY. Consult the article on "Gunpowder" in Ure, *Dictionary of Arts, Manufactures, and Mines* (London, 1878); Spon, *Encyclopædia of the Industrial Arts, Manufactures, and Commercial Products* (London, 1879-82); Thorne, *Dictionary of Applied Chemistry* (London, 1890-93); and especially the *Manufacture of Explosives: A theoretical and practical treatise on the history, the physical and chemical properties, and the manufacture of explosives, with a full bibliography*, in two volumes, by Oscar Guttmann (New York, 1895). See ARTILLERY; BALLISTICS; EXPLOSIVES; GUNS, NAVAL; ORDNANCE; etc.

GUNPOWDER PLOT, THE. A project for destroying the King, Lords, and Commons at the opening of Parliament on November 5, 1605. While James I. (then James VI. of Scotland) was an aspirant to the English throne, he had given the Roman Catholics reason for believing that he intended to favor them; but after his accession he was extremely severe in enforcing against them the existing penal laws. Disappointed and angered by this policy, a few desperate Catholics banded together to remedy the evil by overthrowing the Government. The originator of the scheme was Robert Catesby, a man of good birth, who had plotted against Elizabeth. First he took John Wright and Thomas Winter into his secret. After trying in vain to gain toleration for the Catholics through the mediation of Spain, these three men proceeded to their desperate task. They drew into the plot Guy Fawkes (q.v.), a soldier of fortune, who had made a reputation in war, and whose character was determined and fearless, and Thomas Percy, a relative of the Earl of Northumberland. They began to undermine Parliament House from an adjoining tenement which they had hired. One day after they had laboriously pierced the wall, three yards thick, they were alarmed by a noise, which as Fawkes discovered came from a vault under the House of Lords. Finding that this cellar was soon to be vacant, they hired it, and stored in it barrels of gunpowder, which they covered with stones and billets of wood. Their object was not only to conceal the powder, but also to supply an abundance of destructive missiles. While this work was progressing a brother of Wright, a brother of Winter, and a few other obscure persons were added to the conspirators. But they needed money; and to supply it three others were induced to join the plot—Sir Everard Digby of Gatehurst in Buckinghamshire, a young gentleman of large estates; Francis Tresham, a follower of Essex, like Catesby and Percy, but unlike them a cold, selfish man little suited to a conspiracy of the kind; and Ambrose Rookwood, also a wealthy gentleman residing in the country. In the final arrangement for the execution of their plot at the assembling of Parliament on November 5th, Fawkes was to set fire to the gunpowder in the cellar, and then flee to Flanders in a ship provided from Tresham's money, and waiting ready on the Thames. Although they agreed to warn their Roman Catholic friends in Parliament of the impending danger, in this matter they hit upon no common plan of action. The indiscretion (if not treachery) of one of their number accordingly exposed their whole scheme. Ten days before the opening of Parliament Lord Monteagle, a brother-in-law of Tresham, was at supper in his country house at Hoxton, when a page handed him a letter received from a stranger, advising him "to devise some excuse to shift off your attendance at this Parliament, for God and man hath concurred to punish the wickedness of this time." That this letter was written by or for Tresham there can be little doubt, though Tresham himself when accused by Catesby positively denied it. That he desired to save

his friend would be of itself a sufficient reason for writing it; but it is not altogether improbable that Tresham wished to expose the plot, and at the same time allow his fellow-conspirators an opportunity to escape. That they might have escaped but for the unreasonable hopes of Catesby is all but certain. On the evening of the fourth the Lord Chamberlain and Lord Monteagle visited Parliament House, and entering the cellar in a casual way, told Guy Fawkes, whom they found there, and who passed as Percy's servant, that his master had laid in plenty of fuel. In spite of this direct warning Fawkes clung to his post, though escape was still possible; and on the morning of the fifth, a little after midnight, he was arrested as he came from the cellar dressed for traveling.

On his person the magistrate found slow matches, and in the cellar a lantern burning, and a hogshead and thirty-six barrels of gunpowder. Examined under torture, Fawkes confessed his own guilt, and after long obstinacy revealed the names of his associates. Nearly all the others were killed on being taken, or died with him on the scaffold. Tresham, who at first went about openly, was finally arrested, and died of sickness in the Tower. Fawkes was a man of some excellent qualities; his aim was unselfish, but his zeal was wholly misdirected. So far from remedying the oppression of the Roman Catholics, he greatly increased their miseries. The memory of this mad plot, invested with much fiction and intentionally enveloped in mystery for State and religious purposes, was long perpetuated by an annual festival on November 5th, in which it was customary to burn Fawkes in effigy.

BIBLIOGRAPHY. *The Gunpowder Treason, with a Discourse of the Manner of Its Discovery and a Perfect Relation of the Proceedings Against Those Horrid Conspirators* (London, 1679; reprinted, with additions from the official report); *Arraignment and Execution of the Late Traitors*, etc. (London, 1872; reprinted from ed. of 1606); *Archæologia*, xii., 202; Howell, *State Trials* (London, 1809-26); Winwood, *Memorials of Affairs of State in the Reign of Queen Elizabeth and King James I.* (London, 1725); Gardiner, *What the Gunpowder Plot Was* (London, 1897); J. Gerard, *What Was the Gunpowder Plot?* (London, 1897); J. S. J. Gerard (contemporary), *The Condition of the Catholics Under James I.*, edited by Morris (London, 1871); Gerard (of Stonyhurst), *The Gunpowder Plot and the Gunpowder Plotters*, reply to Gardiner (London, 1897). See FAWKES, GUY.

GÜNS, guns, *Hung.* **KÖSZEG**, kē'sĕg. A free royal town in the County of Eisenburg, Hungary, situated 11 miles by rail northwest of Steinamanger (Map: Hungary, E 3). It has a castle of the princes of Eszterhâzy, a fine modern church, and two convents. Its educational institutions comprise a gymnasium and a military school. Güns obtained municipal rights in 1328, and became a free royal town in 1648. It is noted for its gallant resistance to the attacks of the Turks under Solyman II. in 1532. Population, in 1890, 7253; in 1900, 7930.

GUNS, NAVAL. Neither gunpowder nor guns were invented in the modern sense of the word. They were developments that, in their earlier forms, were scarcely distinguishable from previous types. Greek fire (q.v.) and other ancient incendiary compositions contained all of the essential ingredients of gunpowder, and it was discharged through tubes, the prototypes of guns, placed in the bows of galleys. The force with which the flame and gas issued from the tubes may have led to placing darts or hard substances in the tubes so that they might be thrown out as projectiles. The earliest guns of which we have knowledge were certainly very crude affairs, and their immediate predecessors were probably cruder still, so that the importance of the impending change was not realized. If we regard the incendiary tubes as the prototypes of the gun, the latter seems to have been first developed in naval warfare.

The earliest record of the use of guns on shipboard is derived from an old Japanese painting of the repulse of the Mongol fleet off the shores of Japan in A.D. 1281, the fleet being shown wreathed in smoke from its guns. Kublai Khan, the Mongol-Chinese Emperor, certainly had an ordnance department at this time, and it is not unlikely that he mounted some guns on the vessels of his fleet. The first recorded use of guns on European ships is in the thirteenth century. In 1350 the Moors of Spain are said to have used cannon in a sea fight with the Moors of Tunis, and in 1837 the French and English fleets fought at sea with guns. Up to this time the pieces were fired over the rail of the ship, but early in the fourteenth century gun-ports were invented—a suggestion of Descharges, a shipbuilder of Brest—and the number of pieces carried rapidly increased, so that toward the end of the century the Queen of Louis XII. made a present to the French people of the *Cordélière*, a ship carrying 60 guns; and the English immediately built a very similar vessel, the *Regent*, to oppose her. The guns carried on these ships were mostly breech-loaders, and we are struck by the fact that they still retained a removable chamber for the powder, similar to the charging piece of the incendiary tubes used in the old galleys. The inefficient closing of the breech made the guns very ineffective, and breech-loading was very generally abandoned in the early part of the seventeenth century. The metal of the earlier guns was wrought iron or brass, but after the general introduction of muzzle-loaders it was either cast iron or cast brass. Some of the early guns were rifled; at the Woolwich Arsenal there is a barrel dated 1547 which is rifled with six grooves, of a twist of one turn in 26 inches.

By the year 1600 rifled small arms firing spherical lead bullets were common, but the disuse of heavy breech-loading guns prevented the development of rifled artillery. Guns of very large size were made in the fifteenth century, those used by Mohammed II. in the siege of Constantinople in 1453 having a calibre of about 25 inches, and firing a stone ball of over 600 pounds weight (see ARTILLERY); and still larger ones with a calibre of 30 inches, and firing stone balls of 1100 pounds weight, are yet to be seen in some of the old batteries on the Dardanelles. Iron shot began to be used about the middle of the fifteenth century, though stone shot were not wholly given up for many decades after this. By the end of the sixteenth century the batteries of ships had become formidable. The Spanish Armada of 1588 was composed of 130 ships carrying 3165 guns, most of which were 4, 6, and 10 pounders, but the two largest ships, the *San*

Lorenzo and *Nuestra Señora del Rosario*, were better armed. The former carried four 60-pounders, eight 30-pounders, six 18-pounders, six 9-pounders, ten 6-pounders, and sixteen small guns—50 guns in all; the latter mounted three 30-pounders, seven 24-pounders, four 18-pounders, one 9-pounder, and 26 small guns, or 41 guns in all. The *Triumph*, the largest English ship in the fleet which opposed the Armada, carried four 60-pounders, three 30-pounders, seventeen 18-pounders, eight 9-pounders, six 6-pounders, and 30 small guns, or 68 guns in all.

Sir Jonas Moore, writing in 1689, says: "All artillery are commonly reduced to three sorts: The first is that of the Culvering, the second Cannons of Battery, the third Cannons Petrieri. To offend afar off, in case of strong resistance, the Culverings do serve, which carries a ball of iron from 14 to 30 pounds weight, though some make these to 120 pounds. As to calibre they are called Whole-Culvering, Culvering, and Demi-Culvering. The Whole-Culvering are called anciently Dragon-Drakes, and carry a ball of iron from 40, 50 to 60 pounds, etc. The Culvering from 35, 30, 25, 20 pounds. The Half-Culvering from 18, 16, and 14. As to length, they distinguish the Culvering into ordinary, extraordinary, and bastard. The ordinary Culvering are long from the touch-hole to the muzzle, 32 calibres. The extraordinary are longer than the ordinary, viz., to 39, 40, and 41 calibres. The bastard are shorter than the ordinary, viz., only 28, 27, and 26. The Cannons of Battery are pieces ordinarily shorter than Culverings. The One-fourth Cannon carries a ball of iron from 16 to 18 pounds. The Demi-Cannon from 20 to 28 pounds. The Cannon from 30, 40, 45 to 50 pounds. The Whole-Cannon from 70 to 120 pounds. The Cannon-Royal from 130 to 150 and 200 pound ball, used by the Turks. The Pitrieroes are so called from its ball of stone, with which they are loaded, from 2 to 100 and 150 pounds." An illustration of the Culverin will be found in the article ARTILLERY.

During the seventeenth century ships increased in size and in battery power, but there was little change in the guns from the muzzle-loaders of 1600. Early in the eighteenth century the method of boring out the guns instead of casting them hollow and not boring out, added something to their accuracy and power. Robins, who published his treatise on gunnery in 1742, invented the ballistic pendulum (see BALLISTICS) for measuring velocities, and pointed out the advantages of rifling and of elongated projectiles.

Until after the War of 1812 the heaviest pieces in use were the long 32-pounder of 55 hundredweight, and the 42-pounder of 57 hundredweight. The advantages of large calibre were understood, as may be seen by the adoption of carronades, but long guns firing projectiles of this size were too heavy for use on board the ships of the day. These pieces were generally fired by means of a priming and slow match; Sir Charles Douglas brought out the flint-lock about 1780, but it was not until after Rodney's battle of April, 1782—in which action was the *Duke*, previously commanded by Sir Charles, and having guns fitted with flint-locks at his own expense—that the advantages of the lock were appreciated. No measures were taken to supply these locks until 1790, when brass locks of a new pattern were supplied, and used up to 1818. The discovery of a composition which could be ignited by friction or percussion was made in 1807 by G. Forsyth, a clergyman. Sir Charles Douglas designed quill primers for his locks about 1780, and a modification of these was used for the new percussion locks. Flint-locks continued in general use up to 1835 or 1840. In 1828 percussion locks were fitted to the guns of the U. S. S. *Vandalia*, but they were not exclusively used in the United States service until 1842, when Hiddon patented the hammer with a slot permitting it to be drawn back from the vent. In 1832 an efficient percussion lock was introduced into the French Navy; the British continued to use some flint-locks until about 1845, when they adopted a modified form of Hiddon's lock.

Sighting was effected by looking along the 'line of metal,' and decisive actions necessarily took place at close range. Soon after 1801 fixed sights on guns were adopted in the British Navy, but the invention of the movable rear-sight, attributed to Colonel Jure of the French Army, did not take place until much later, the method of allowing for distance being to shoot at certain parts of the ship which were higher than the point to be hit.

The next important improvement was the development of the shell gun by General Paixhans. In his *Nouvelle Arme*, published in 1821, he most strongly advocated the abandonment of the use of solid shot in long guns and the adoption of explosive shell, which had hitherto been fired from mortars and howitzers only. General Paixhans's views were adopted, and shell guns were introduced in all navies. The consequences of the introduction of shell guns General Paixhans also foresaw; in 1824, after the new guns were adopted in the French Navy, in an official letter to the Government he prophesied that the new departure in projectiles would force the creation of armored ships. His prophecy was fulfilled and the armored ships in turn caused the development of the rifled gun. In this, France was again the leader. During the Crimean War some 6.5-inch cast-iron rifles were made and mounted for trial on board ship. These were muzzle-loaders of crude design modeled after the Paixhans shell guns, and used studded projectiles; but they proved to be so much more powerful against armor that they immediately gained favor. Other countries followed suit in the development of rifled guns. Prussia decided upon a breech-loading rifle, and in England Armstrong and Whitworth brought out breech-loaders. Krupp's earlier pieces were muzzle-loaders, but in 1862 he exhibited at London his first five cast-steel breech-loading guns. Armstrong brought out his breech-loading rifled field gun in 1855, and naval guns a year or more later. In 1858-59 a series of competitive trials of Whitworth and Armstrong breech-loading rifles resulted in the adoption of the latter. But the method of breech-closure was very defective, and after numerous serious accidents, the navy demanded a return to muzzle-loaders. The French adopted breech-loaders in 1862, but adhered to cast iron as a cannon-metal until 1875. The retention of cast iron by the French and the return to muzzle-loading in England left Krupp's primacy undoubted (as we view the question now), but of course this was not acknowledged at the time.

In the United States the perfection to which muzzle-loading smooth-bores had been brought

blinded the people to the value of the rifle. Many Parrott rifles were made and used in the navy, but it was never a favorite gun. After the close of the Civil War the development of ordnance in

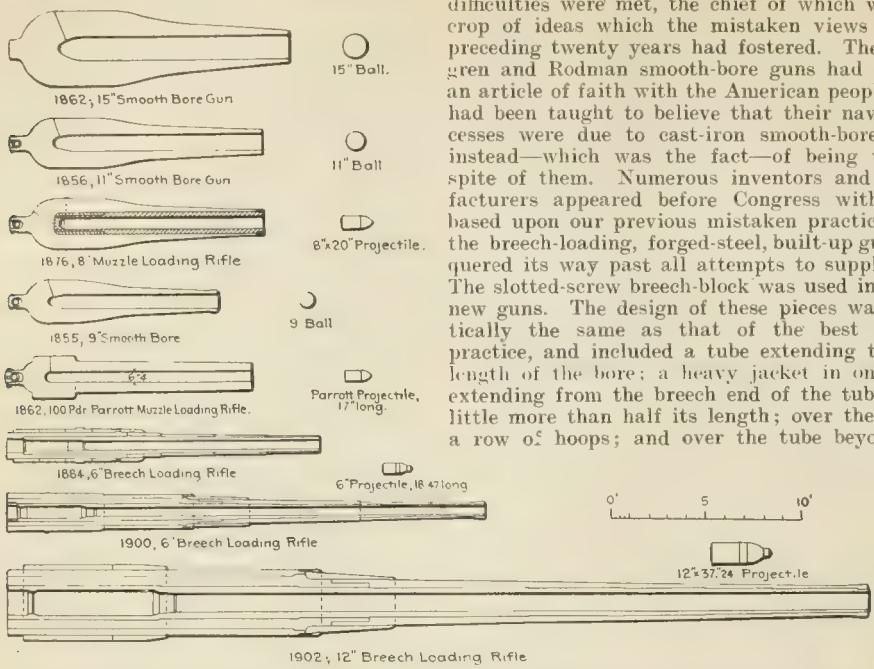
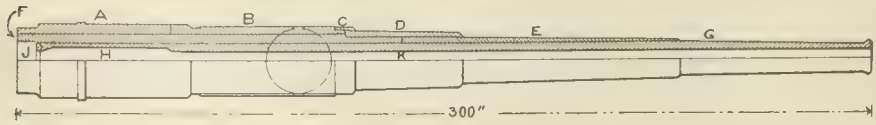


DIAGRAM ILLUSTRATING DEVELOPMENT OF GUNS AND PROJECTILES IN U. S. NAVY FROM 1862 TO 1902.

TYPE OF GUN	Weight of gun	Length of gun	Charge of gun	Weight of shell	Initial velocity per second	Muzzle energy ft.-tons
15-in. smooth bore..	18.7 tons	15 ft. 7.0 ins.	35 lbs.	350 lbs.	1,600 ft	7,997
11-in. smooth bore . .	7.14 "	13 " 3.7 "	27 "	166 "	1,062 "	1,300
8-in. muzzle-loading rifle.....	7.76 "	13 " 3.7 "	35 "	180 "	1,430 "	2,627
9-in. smooth bore.....	4.0 "	11 " 0.0 "	10 "	70 "	1,320 "	847
100-pdr. Parrott	4.35 "	12 " 1.4 "	10 "	100 "	1,080 "	810
6-in. breech-loading rifle	4.74 "	16 " 4.0 "	36 "	100 "	2,000 "	2,773
6-in. " " " .	8.46 "	25 " 0.0 "	40 "	100 "	2,900 "	5,838
12-in. " " " .. .	53.4 "	45 " 0.0 "	360 "	850 "	2,800 "	46,246

both army and navy ceased—largely owing to lack of funds, Congress refusing to grant money for new work. All sorts of repairs and makeshifts were resorted to, such as cutting off the breech of Parrott rifles, putting on a larger hoop, inserting a lining tube, and making them into breech-loaders. (See ORDNANCE.) Eleven-inch Dahlgren smooth-bores were reamed out to a calibre of 13 inches and wrought-iron cores inserted, and these were in turn bored out to a diameter of 8 inches and rifled. In the development of the new ordnance (1880-85) all sorts of difficulties were met, the chief of which was the crop of ideas which the mistaken views of the preceding twenty years had fostered. The Dahlgren and Rodman smooth-bore guns had become an article of faith with the American people, who had been taught to believe that their naval successes were due to cast-iron smooth-bore guns, instead—which was the fact—of being won in spite of them. Numerous inventors and manufacturers appeared before Congress with ideas based upon our previous mistaken practices, but the breech-loading, forged-steel, built-up gun conquered its way past all attempts to supplant it. The slotted-screw breech-block was used in all the new guns. The design of these pieces was practically the same as that of the best foreign practice, and included a tube extending the full length of the bore; a heavy jacket in one piece extending from the breech end of the tube for a little more than half its length; over the jacket a row of hoops; and over the tube beyond the jacket, hoops extending part way or all of the way to the muzzle. The first guns were made of 30 calibres length; between 1883 and 1890 the length increased to 35, after 1890 to 40 and 45 calibres, until the last model, that of 1899, brought out guns of 50 calibres in the sizes below the 7-inch.

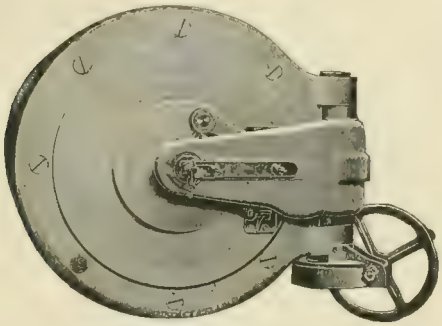
SECTION OF UNITED STATES NAVAL 12 INCH GUN, MARK III., 1899, FORTY CALIBRES (493 INCHES) LONG.



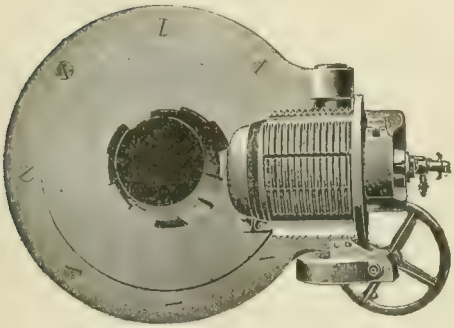
SECTION OF UNITED STATES NAVAL 6-INCH GUN, MARK VI., 1899, FIFTY CALIBRES (300 INCHES) LONG.
A, B, C, D, E, hoops; F, jacket; G, tube; H, powder-chamber; J, screw-box; K, bore.

The breech mechanisms used in the United

States naval service are the Fletcher (several modifications), Dashiell, Vickers-Maxim, Hotchkiss, and Driggs-Schroeder. The Fletcher, which is a development of the Farcot system, is probably the simplest, and is certainly one of the neatest and strongest breech mechanisms known. A worm-wheel on a vertical spindle works in a rack on the breech-plug, and first causes it to turn and disengage the threads and then move to the rear and turn out clear of the breech. The vertical spindle is driven by a worm and worm-wheel in the larger calibres, in the smaller ones simply by a handle pivoting on it. The Dashiell and Vickers-Maxim are operated by a short arm driven from the vertical axis of the operating lever, which shifts its centre during the motion. The Hotchkiss breech-block is a vertically sliding wedge, and the Driggs-Schroeder block drops to clear its upper end from the housing of the breech and then revolves to the rear about a horizontal axis; these two mechanisms are only used in 6-pounders and smaller pieces. See RAPID-FIRE GUNS.



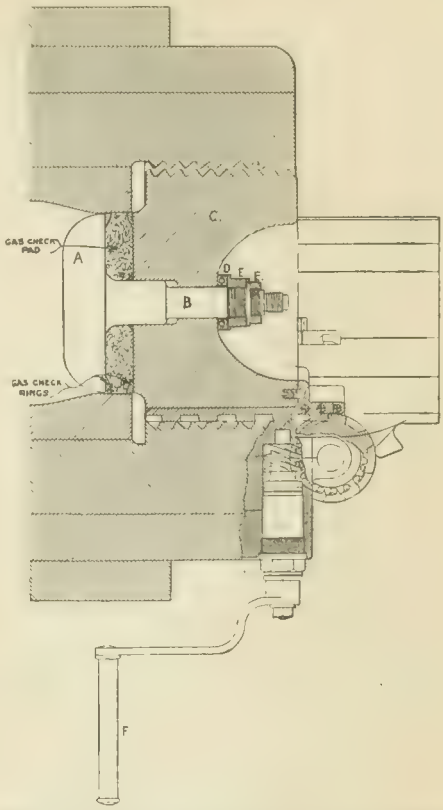
Breech closed.



Breech open.

VICKERS BREECH MECHANISM, SHOWING WELIN BREECH.

All new guns in the United States Navy are fitted with the Welin system of breech-closure, a modification of the slotted screw. The inside of the screw-box is cut away in steps in the following manner: It is divided by twelve (usual number) radial planes; three of the sectors are smoothed out to a maximum diameter, and form the *blanks* of the screw-box; the next sector (in the direction toward which the block turns in closing) has a radius which is less by a little more than the height of the threads on the block or in the screw-box; the next has a radius smaller than the preceding by a similar amount; the next sector is likewise reduced in radius; while the next is another blank from which the succeeding sectors rise in steps, as from the first one. The advantage of the Welin system is that three-fourths or five-sixths (if desired) of the circumference of the block is available for screw-



UNITED STATES NAVAL BREECH MECHANISM FOR MARK III. 12-INCH GUNS, SHOWING DE BANGE GAS-CHECK.

A, mushroom head; B, mushroom stem; C, breech-plug; D, frictionless washer; EE, lock nuts; F, operating crank.

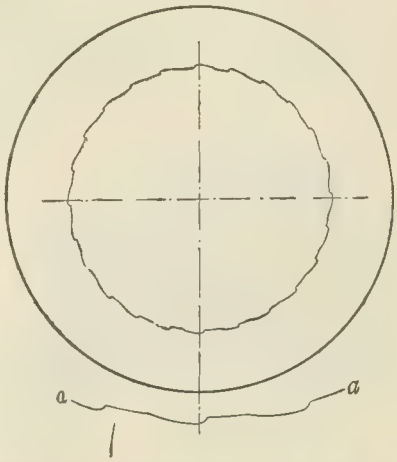
surface to resist the powder pressure instead of one-half as in the old block of ordinary model; this enables the Welin block to be made shorter, and therefore lighter.

The gas-checks used in naval guns are the Broadwell ring or cup gas-check used by Krupp, and some modification of the De Bange gas-check, such as is used in United States naval ordnance and in nearly all ordnance using a screw breech-block. The Broadwell ring is a steel ring with a section somewhat like a letter L. When the gun is fired the pressure of the powder gas presses the lips of the ring against the walls of the chamber and against the face of the breech-block, and so cuts off the escape of the gas to the rear. The De Bange gas-check is more complicated. As originally made, it consisted of a ring-shaped pad of asbestos saturated with suet, covered with canvas, and held between two disks with large holes through their centres, through which, and the hole in the pad, passes the stalk of the steel block called the *mushroom*, because of its shape. The disks holding the pad between them are themselves held between the mushroom head and front face of the breech-plug. The opposing faces

of the disks are hollowed out so that a section of one side is somewhat like half of the letter I. When the powder pressure acts on the mushroom head the pad is squeezed and forced out against the surface of the bore, and at the same time the outer lips of the disks are also forced outward against it; this combination of metallic and pad contacts cuts off all escape of gas to the rear. In the latest types of gas-checks used in United States naval guns the shape of mushroom head, gas-check, and rings has been modified, but the principle remains the same. The front disk (and in some cases the other as well) is now usually split on one side by a plane passing through the centre of the disk and making an angle of about 75 degrees with the axis of the bore; this permits of a close fit without danger of jamming or sticking. In guns using fixed ammunition the cartridge-case acts as a gas-check, its thin walls expanding under the action of the powder gas until they press against the walls of the chamber so tightly that no gas escapes.

Naval guns are fired by electric, percussion, combination (electric and percussion), or friction primers. In the United States service only the first three varieties are used, and all guns are being fitted to use the combination primers as rapidly as opportunity offers. The electric and percussion primers are small tubes of copper an inch and a half long with enlarged heads not unlike in shape the bottle-neck small-arm cartridges if we imagine the part of the cartridge which is of large diameter to be very short; the electric primer has a small wire projecting from it which connects to a firing circuit; the percussion primer has only a cap in the head like a centre-fire cartridge. The combination primer is similar to a 32-calibre cartridge shell, but much longer; the cap in the head, if struck, will cause the primer to explode; and it is insulated from the shell of the primer so that if touched by the point of an electric contact piece the current will flow through the cap, then through a bridge of fine platinum wire, thence to the shell of the primer, to the gun, and to earth. As the current passes through the platinum bridge it heats it white hot, igniting the priming composition, and that in turn ignites the charge, as with other primers. Primers are fired in locks, of which there are three styles in use. The oldest, called Mark VI., is fitted for electric or percussion firing, but to change from one to the other it is necessary to remove the wedge or breech-block of the lock. Mark VIII. is fitted for use with combination primers; to change from one method of firing to the other, it is only necessary to connect or disconnect the electric firing wire. The only other lock in service uses the combination primer, and differs from Mark VIII. in automatically ejecting the primer after firing. It is used on quick-fire guns. In all cases, the lock screws on the rear end of the mushroom stem. Somewhat similar locks are used in foreign navies. To prevent premature firing of guns—for it is convenient to insert the primer while loading is going on—the electric circuit is not complete through the primer until the breech-block is closed and fully turned into place, so that the contacts placed in the proper position are pressed together; the pressure of the firing key will then complete the circuit. In quick-fire and rapid-fire guns (see RAPID-FIRE GUNS), a detent holds the percussion firing pin back so that it cannot strike the primer until the breech is closed and locked. The electric current for firing is obtained from electric batteries at the guns or a current of reduced voltage derived from the dynamo.

The rifling of United States naval guns is polygroove with a twist which increases from zero to one turn in twenty-five calibres; that is to say, the projectile starts along grooves which at first are parallel to the axis of the bore, but which almost immediately begin to incline to form a spiral on its inner surface, the inclination increasing to a point near the muzzle from which the spiral is uniform; the projectile is thus caused to rotate faster and faster, until, when it leaves the muzzle, it is spinning at a rate that will make it revolve once while moving a distance equal to twenty-five times its diameter.



SECTION OF UNITED STATES NAVY 6-INCH GUN SHOWING RIFLING. ALSO ENLARGED PLAN OF RIFLING (*a*, *a*).

The grooves are .05-inch in depth and several times as wide, but decrease in width as the muzzle is approached, and their number is usually four times the calibre expressed in inches (for a 6-inch gun, $4 \times 6 = 24$); but there are some exceptions.

In the design of naval guns the weights are kept down as much as possible, as every additional ton of weight carried involves three or four tons extra displacement in the ship. In guns for forts and fixed defenses on shore, small savings in weight are unimportant. The largest guns now being made for ships of any navy are of 12-inch calibre, though many very new 13-inch are carried on recently built ships of the United States Navy and many 13.5-inch guns are in service in the British and French navies. The heaviest guns ever put on board ship were the 16.25-inch, 110-ton guns of the British battleships *Victoria*, *Sanspareil*, and *Benbow*. The first-named was lost in collision, so that the *Sanspareil* and *Benbow* are the only vessels now carrying them. Aside from their unwieldy size, which made them undesirable, these guns were faulty in design and were poorly constructed, so that they never gave satisfaction. Guns of 100 tons weight were mounted in Italian battleships many years ago, but some of these have been removed and replaced by others of less weight and smaller calibre, and the others are likely to be if the vessels are not condemned as not worth

re-arming. At present, the general opinion in all navies is that the 12 inch gun is the largest necessary or desirable to mount on board ship.

Wire-wound guns are used in the British service, and some few guns of this type have been built for Japan, but the naval authorities of other countries do not favor them. Ample strength is usually secured by forged steel tubes, jacket, and hoops to stand the pressures desirable with modern powders, but if transverse strength alone were to be considered there would be no objection to additional safety secured by wire-winding. The great defect of wire-wound guns is their lack of longitudinal stiffness, the wire not only failing to add any strength in this direction, but interfering with the stiffening due to the hoops. Should the time come when greater pressures than those now used are found desirable, then wire-winding may be resorted to, but until that time arrives it is not likely to become general. Higher pressure in guns entails an increase in temperature in the chamber and consequent additional erosion of the bore, and also adds to the difficulty of checking the escape of gas to the front around the projectile and to the rear around the breech gas-check.

TABLE OF ELEMENTS OF LATE TYPES OF UNITED STATES NAVAL GUNS (MODELS OF 1899)

Giving perforation of face hardened armor, service velocities, at ranges up to 3000 yards, with smokeless powder Capped and uncapped armor-piercing projectiles, at normal impact.

CALIBRE OF GUN	Weight in tons	Length in calibre	Total length in inches	Approx. charge of smokeless powder for muzzle velocity, lbs	Weight of projectile, lbs	Muzzle velocity, foot seconds	Muzzle energy, foot tons	Perforation at muzzle: Harvey nickel-steel: Capped projectiles	Perforation at muzzle: Harvey nickel-steel: Uncapped projectiles	Perforation at muzzle: Krupp armor: Capped projectiles	Perforation at muzzle: Krupp armor: Uncapped projectiles	Remaining velocity at 1000 yds.
3-inch, Mark I.....	.87	50	154.3	.5	13	2,800	709	4.4	3.6	4.4	3.6	2,130
4-inch, Mark VII....	2.56	50	204.5	15	32	2,900	1,870	6.7	5.7	6.4	5.6	2,380
5-inch, Mark V .	4.46	50	255.	27	60	2,900	3,503	8.6	7.5	8.4	6.6	2,460
6-inch, Mark VI.....	8.37	50	300.	46	100	2,900	5,838	10.9	9.3	10.9	7.3	2,525
7-inch, Mark I. .	13.33	45	315.	74	165	2,900	9,646	13.2	11.8	13.2	10.5	2,580
8-inch, Mark V	18.	45	343.	115	250	2,800	13,602	15.0	13.6	15.	12.1	2,530
10-inch, Mark III.....	33.4	40	400.	240	500	2,800	27,204	20.	18.6	20.	17.1	2,585
12-inch, Mark III.....	52.	40	493.	385	850	2,800	46,246	25.	23.4	25.	21.7	2,620

CALIBRE OF GUN	Perforation at 1000 yds.: Harvey nickel-steel: Capped projectiles	Perforation at 1000 yds.: Harvey nickel-steel: Uncapped projectiles	Perforation at 1000 yds.: Krupp armor: Capped projectiles	Perforation at 1000 yds.: Krupp armor: Uncapped projectiles	Remaining velocity at 2000 yds.	Perforation at 2000 yds.: Harvey nickel-steel: Capped projectiles	Perforation at 2000 yds.: Harvey nickel-steel: Uncapped projectiles	Perforation at 2000 yds.: Krupp armor: Capped projectiles	Perforation at 2000 yds.: Krupp armor: Uncapped projectiles	Remaining velocity at 3000 yds.	Perforation at 3000 yds.: Harvey nickel-steel: Capped projectiles	Perforation at 3000 yds.: Harvey nickel-steel: Uncapped projectiles	Perforation at 3000 yds.: Krupp armor: Capped projectiles	Perforation at 3000 yds.: Krupp armor: Uncapped projectiles
3-inch, Mark I	3.1		3.1		1,620									
4-inch, Mark VII	5.3	4.4	5.2	4.4	1,955	4.	3.4	4	3.4	1,605	3.2		3.2	
5-inch, Mark V .	7.	6.	6.7	5.6	2,085	5.7	4.7	5.5	4.7	1,770	4.6	3.9	4.6	3.6
6-inch, Mark VI.....	8.9	7.7	8.8	6.8	2,185	7.4	6.4	7.2	6.	1,805	6.2	5.3	5.9	5.2
7-inch, Mark I	11.4	10.1	11.4	8.9	2,295	9.8	8.6	9.7	7.6	2,040	8.5	7.4	8.3	6.5
8-inch, Mark V . . .	13.2	11.8	13.2	10.4	2,290	11.7	10.4	11.7	9.1	2,070	10.3	9.	10.3	7.9
10-inch, Mark III	18.3	16.7	18.3	15.	2,390	16.5	15.	16.5	13.5	2,210	15.	13.	15.	11.5
12-inch, Mark III.....	23.	21.4	23.	19.4	2,450	21.2	19.6	21.2	17.9	2,295	19.5	17.9	19.5	16.2

MOUNTS FOR NAVAL GUNS.

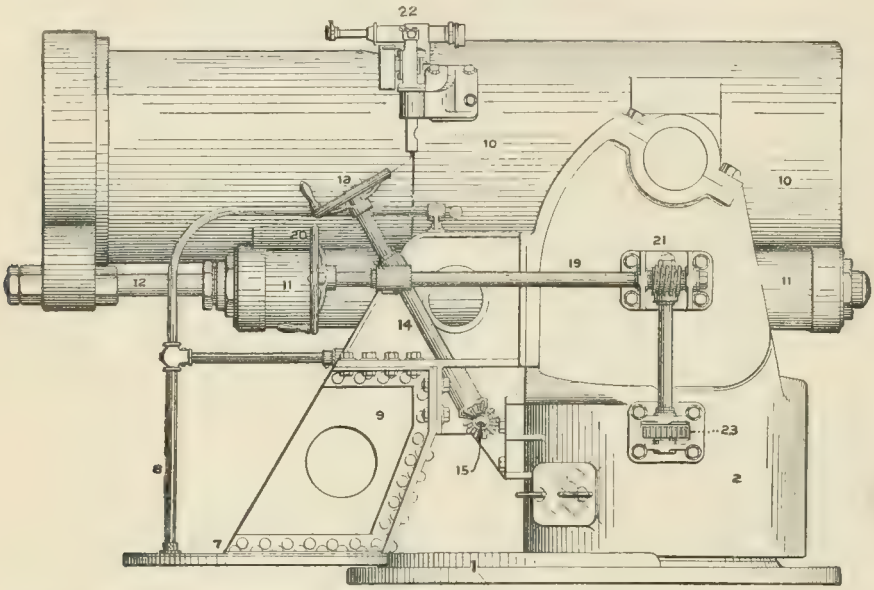
Mounts for naval guns are of three types, turret, deck, and rail. The principal features of mounts are the method of checking recoil, returning the gun to the firing position after recoil, elevating, training, sighting, and loading. Up to the middle of the nineteenth century naval guns were mounted upon simple wooden carriages with heavy side frames or timbers supporting the trunnions and resting on little wooden wheels called the trucks. The sides of the carriages were held together by framing called transoms, the rear one supporting the breech and elevating device. The latter consisted at first of a large wooden wedge, but was replaced by an iron elevating screw. (See illustrations under ORDNANCE.) The recoil was checked by a heavy rope called the breeching, passing around the breech of the gun and secured at the ends to the ship's side; the length of the breech was sufficient to allow the gun to recoil several feet, and this not only reduced the strain on the breeching, but also allowed the gun to come in far enough so that it was easily loaded. After loading, the gun was run out and trained by tackles. Some guns were pivoted amidships, and these had a lower structure mounted on trucks called a slide, on which the gun-carriage slid during recoil. The recoil was taken up by breeching secured to the slide, and the strain transferred to the deck by means of a pivot belt. The broadside mounts or carriages continued in favor until the Civil War, when the turret system was established by the monitors.

Modifications of the old carriages were still used on the broadside, though they had begun to be made of iron and brass. The increased size of ships, however, caused the pivot carriages to be fitted for shifting from side to side, and the convenience of training them resulted in the so-called muzzle-pivot carriage, which was only the old pivot carriage fitted with an arm at the forward end pivoted at the ship's side. About 1885 the central-pivot carriages were brought

into use, and these were so much more complicated that the term mount began to be applied to them as well as to the fittings of the turret guns. The central-pivot carriage was very heavy and clumsy, however, and it was displaced some eight or ten years later by the pedestal mount, which had the further advantages of returning the gun to the firing position by the use of heavy springs compressed during recoil and of permitting the gun to pivot close out to the side. Improved pedestal mounts are still in general use for guns carried on deck, and there seems to be no immediate prospect of their being displaced. The latest one consists of a heavy casting called the pedestal, bolted to the deck; a top-carriage resting on cone-shaped rollers or balls working in a roller path on the pedestal; an oscillating sleeve with trunnions on the sides resting in trunnion sockets on the top-carriage; lastly, elevating and training gear, combined recoil and counter-recoil cylinders, and sighting mechanism. The gun recoils through the sleeve which is cast in one with the cylinders; these latter have pistons connected by rods to a band around the gun; inside the pistons are heavy counter-recoil springs and a liquid consisting of glycerin, 80 per cent., and water, 20 per cent. As the gun recoils the liquid escapes past the piston-head in small grooves, decreasing in depth from front to rear, which are cut in the inner surface of the cylinders. The water pressure gradually brings the gun to rest, the pressure of the springs assisting. As soon as the recoil is checked the springs return the gun quickly to the front, the total time of recoil and return to firing position (or to battery, as it is called) being only a fraction of a second.

The elevating and training are effected by hand-wheels driving shafts connected to cogged racks or worm gearing, the perfect balance of parts and the ball-bearings rendering very little power necessary to train or elevate rapidly. The loading of guns on pedestal mounts is almost invariably performed by hand, though the ammunition is generally hoisted from below by electric or hand ammunition hoists. In the United States Navy all guns of 4-inch calibre and larger are fitted with telescope sights, and have been so fitted for years, but in other navies the telescope is just beginning to be appreciated. It is about 15 inches long with an object glass about 2 inches in diameter. The magnifying power is not great—only about two diameters—but the real gain is not in this direction. Ordinary bar sights consist of a fixed, pointed bar on the trunnion, and a bar on the breech with a notch in the top. The rear sight-bar can be moved up and down in its sight-box in order to adjust it to the elevation corresponding to the desired range (for which the bar is marked on the side). To take sight on the object it is necessary to bring the rear sight notch, the tip of the front sight, and the point aimed at all in the same line; the three objects are all at different distances, and the eye sees them all imperfectly or else one perfectly and the others imperfectly. The result is defective shooting. In the telescope sight the cross-wires are at the optical focus, and the image of the object aimed at is also formed there so that the eye is not straining to adjust itself to several focal lengths simultaneously. Furthermore, the object aimed at is seen as well when below the cross-wires as above them—a most important point when the ship is rolling. The principal objections urged against telescope sights are their fragility and the ease with which they may be thrown out of adjustment. Ten years' use in the United States Navy does not sustain the validity of these objections. Furthermore, for use in dark turrets or bright sunlight, they are a great relief to the eye, which is disturbed by irregular light on ordinary sights.

Small guns, 6-pounders and less, have small, light mounts, called cage stands. They are like



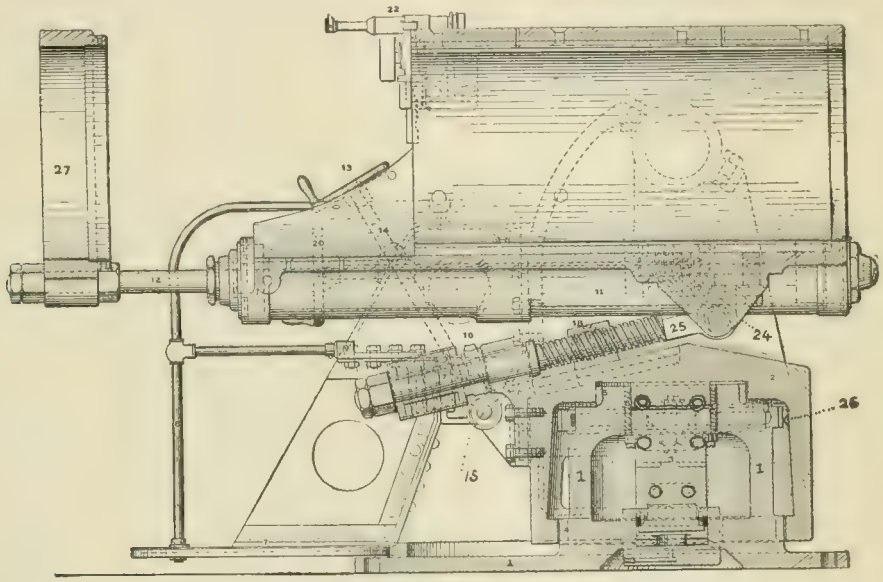
1 SIDE VIEW.

PEDESTAL MOUNT, MARK VII., FOR 6-INCH BREECH-LOADING RIFLE, MARK VI., UNITED STATES NAVY

For key to numbers, see sectional drawing

pedestal mounts, but simpler, though fully adequate to their purpose. Rail mounts consist of sockets bolted to the rail or upper works of a ship in which fit the stalks of the top-carriages of light guns. Mounts for light guns in military tops run on a rail inside the top-rail, and the force of the recoil is received by a clamp extending over the top-rim.

Turret mounts are by far the most complicated of any fitted in ships. For small guns they differ chiefly in the ammunition hoist and training mechanism, which latter is necessarily effected by means of a motor—electric, steam, hydraulic, or compressed air—as the whole turret and contents turn when the gun is trained. In turrets for large guns the size of the guns entails numerous special appliances. The shell and powder-charge are both too heavy to handle, and power appliances are necessary, not only for hoisting them up from below, but for loading them into the gun. Nevertheless, in the general arrangement of recent turret mounts much has been borrowed from the lighter deck types. The gun is generally balanced on extensions (called *knife-edges*) projecting from the trunnions which are shaped like V's, the sharp edge (not very sharp by the way) resting on a hard steel bar. The latter is supported at the ends, and gives sufficiently, when the gun is fired, for the trunnions to drop .02 of an inch and bear against the heavy trunnion seats. As the gun is normally supported on the knife-edges and is quite accurately balanced on them, it is easily elevated and depressed by hand gear. The recoil is taken up by four recoil cylinders equally spaced about the gun and containing pistons working in a mixture of 80 per cent. glycerin and 20 per cent. water; the cylinders also contain the heavy counter-recoil springs made in short lengths separated from each other by disks, which are free to move with the springs. The ammunition car, hoisted by a wire rope, the motive power usually electric, carries an entire round—powder and projectile. It is stopped in rear of the open breech and the shell, and then the powder pushed in by a sectional rammer, also operated by electricity. The training is done by a turret trainer in the central or forward hood (an armored lookout large enough for the head and shoulders, and rising about a foot above the top of the turret) who attends to nothing else but keeping the guns directed to the proper part of the enemy's vessel, following the directions of the turret officer. The gun-firers are in the side hoods. Each has controlling mechanism for elevating his own gun and the sight, which in our naval service is invariably of the telescopic type and carried on a side arm which is given the proper direction by a system of parallel motion connecting with the trunnions of the gun-slide. The magazines and shell-rooms are grouped about the base of the turret shaft leading below, and are fitted with shell and powder trolleys for bringing ammunition to the ammunition car when it is down; and the men handling the ammunition are under the orders of the turret officer.



2. SECTION.

PEDESTAL MOUNT, MARK VII., FOR 6-INCH BREECH-LOADING RIFLE, MARK VI., UNITED STATES NAVY.—LONGITUDINAL SECTION.

1, Pedestal; 2, top carriage rest on ball-bearings; 3, pivot; 4, 5, composition rings; 6, vertical rollers; 7, gun firers' platform; 8, hand-rail; 9, bracket; 10, sleeve through which gun recoils; 11, recoil cylinders; 12, recoil cylinder piston-rods; 13, elevator wheel; 14, elevator shaft; 15, elevator shaft (horizontal); 16, elevator worm-wheel; 17, elevator worm-wheel shaft; 18, elevator worm wheel nut connecting to lug (24) on gun by two arms (25). 19, training shaft; 20, training wheel; 21, training worm; 22, telescope sight; 23, training gear-wheel which trains gun by working in rack (26); 24, 25, see 18; 26, see 23; 27, recoil band to which recoil piston-rod is attached.

BIBLIOGRAPHY. For further information on naval guns, the reader should consult the following works: *Annual Reports of Office of Naval Intelligence* (Washington); *Proceedings of the United States Naval Institute* (Annapolis, Md.; current); *Annual Reports of the Chief of Bureau of Ordnance United States Navy*; Ingersoll, *Text Book on Ordnance and Gunnery* (Annapolis, 1899); Brassey, *Naval Annual* (London, annually); the *Naval Pocket Book* (London, annual-

ly); *Scientific American* (New York, current); *Engineer* (London, current); *Engineering* (London, current). See also articles on RAPID-FIRE GUNS; MACHINE GUNS; GUNNERY; ORDNANCE; ARMOR PLATE; SHIPS, ARMORED; section on *Navy*, under UNITED STATES; AMMUNITION; PROJECTILES; EXPLOSIVES; GUNPOWDER, etc.

GUNSAULUS, gun-sa'lus, FRANK WAKELEY (1856—). An American clergyman of the Congregational Church. He was born at Chesterville, Ohio, graduated at Ohio Wesleyan University in 1875, was ordained to the Methodist ministry, but later became a Congregationalist, and was pastor of Congregational churches at Columbus, Ohio (1879-81); Newtonville, Mass. (1881-85); and Baltimore, Md. (1885-87). From 1887 to 1899 he was pastor of Plymouth Church, Chicago, and in 1899 accepted a call to the Central Church of that city. He was also president of the Armour Institute of Technology from 1893 to 1901. He has been widely known as a preacher, and has lectured on "Savonarola," "John Hampden," and other subjects. His published works include: *Monk and Knight: An Historical Study in Fiction* (1891); *Phidias, and Other Poems* (1893); *Gladstone: The Man and His Work* (1898); and *The Man of Galilee* (1899).

GUNSHOT WOUND. A wound produced by a missile projected from a pistol, rifle, cannon, etc., by the force of any explosive. Such wounds may vary in severity from a simple bruise to the tearing away of a whole limb. Single balls produce an incised, bruised, or lacerated wound, according to the amount of their velocity when they strike the body. The effects of small shot vary with the distance and power of the gun: when at short range the pellets enter so close together as to make one wound like that of a single ball. It was once commonly believed that the 'wind of a large shot' could produce serious injuries; this belief may have arisen from the circumstance that when a heavy ball, which has lost some of its force, strikes the body at a particular angle, the skin does not always give way, but the deeper structures, such as the muscles, or large organs, as the liver, may be completely crushed. When a bullet perforates the body, the entrance opening, which is generally depressed, round, and regular, is often smaller than that of the exit. The modern conical ball makes a well-defined oblong wound; but it may shift its direction, strike longitudinally, and cause a more extensive injury to the skin. When a bullet strikes the shaft of a bone, it cracks or splinters it, and either remains or passes through the cancellated ends. In its course the ball may carry before it pieces of cloth, coins, or other foreign bodies, which increase the danger from the wound. The modern bullet of small calibre, traveling at a very high rate of velocity, such as the bullet projected by the Mauser, Lee-Metford, or Krag-Jörgensen rifles, produces a small round wound of entrance and a wound of exit of nearly, if not quite, similar character. As a rule all tissues, including bone, are clearly perforated; but occasionally, usually at close range, or where a soft-nosed bullet is employed, the destruction of tissue may be very great.

Hemorrhage is as a rule very slight, though occasionally a blood-vessel of importance may be perforated. Injuries to the blood-vessels are considerably more frequent with modern high-velocity projectiles than they were with the old-fashioned bullets of low velocity, which occasionally bruised the vessels, but more often pushed them aside instead of cutting them. Many persons who have been shot during the excitement of battle describe the sensation as resembling the sharp stroke of a cane; but in most instances the man soon begins to tremble, complains of cold, his face becomes pale, his pulse is scarcely perceptible, and he appears as if about to die. This is the condition termed *shock;* and though death sometimes does ensue during this state of prostration, it is not so serious as it appears, and the patient will probably pass out of it in a few hours, with the help of stimulants and rest. Although excessive bleeding is not so common after gunshot as after other kinds of wounds, it may occur immediately and to a fatal extent, if assistance be not afforded. The first assistance in the treatment of a gunshot wound is to preserve cleanliness in the locality of the injury. This is to be done by immediately applying a dressing or compress of gauze to the injured surface. In modern warfare every man who goes into the field is supplied with one of these sterile dressings in a compact form, with directions for applying it. In private practice, or under circumstances where a sterile dressing is not immediately at hand, the dressing should be wet with some antiseptic solution, such as carbolic-acid solution of a strength of 1 to 60, or mercuric chloride (corrosive sublimate), 1 to 1000. Where hemorrhage is free, pressure should be applied directly to the wound by means of compresses or with the hands or bandage. If this does not control the bleeding, an improvised tourniquet (q.v.) should be applied to the limbs. When a bone has been broken by the shot, a suitable splint or support must be applied. The further management of a case, beyond the administration of such stimulants as may be needed, should be at the hands of a surgeon.

At the present time, surgeons do not probe for a bullet except in rare instances. To pass a probe through the opening made by a missile in several layers of tissue it is necessary to place the patient in the same position in which he was when the wound was received, if the tissues are movable or slide one upon the other. This is generally impossible; and very often the probe will make a false passage, opening up a new track for possible infection, and never strike the bullet. In the case of the imbedding of a bullet in the brain, the substance of which is not contractile, and which alters but little in relative position to the skull after a gunshot wound, probing is allowable if the probe enters easily. It is most desirable to remove the bullet in such a case. Frequently its position may be inferred with considerable accuracy from the symptoms.

GUN'TER, ARCHIBALD CLAVERING (1847—). An American novelist. He was born in Liverpool, England, and when quite young was taken by his parents to California, where he was educated in the public schools, and at the School of Mines of the State University. From 1868 to 1874 he was employed as a mining and civil engineer and chemist, and from 1875 to 1878 was a stockbroker in San Francisco. He then removed to New York City, and devoted himself successfully to literature. He became the owner of the Home Publishing Company, and a number of his books, several of which were extremely popular,

bear the imprint of that firm. His best-known novels are: *Mr. Barnes of New York* (1887); *Mr. Potter of Texas* (1888); *That Frenchman!* (1889); *Jack Curzon* (1899); and *A Manufacturer's Daughter* (1901). As a playwright he is also well known, his most successful plays being *Prince Karl* and *Mr. Barnes of New York*.

GUNTER, Edmund (1581-1626). An English mathematician and astronomer, born in Hertfordshire. He was educated at Westminster and at Christ Church, Oxford, and became professor of astronomy in Gresham College (1619). He was an enthusiastic student of mathematics, and a genius of no mean order. He observed the variation of the magnetic needle, improved the instruments for navigation, and invented the surveyor's chain. The latter, known as Gunter's chain, is 66 feet long, and is composed of 100 links of 7.92 inches each. It is convenient in practice, since it is graduated on the decimal scale, and since 10 square chains make an acre. For certain purposes, however, chains (or steel tapes) of 50 or 100 feet (called engineer's chains) are more convenient. Gunter's sector or line consisted of a scale graduated according to the logarithms of numbers, of sines, and of tangents, so that areas, heights, volumes, and other magnitudes could easily be calculated therefrom. He was the first (1622) to give the annual variation of the magnetic declination, and to use arithmetical complements in logarithmic work. His chief works are the *New Projection of the Sphere* (1623), and the *Canon Triangulorum*, or *Table of Artificial Sines and Tangents* (1620). His collected works were published in 1624 (2d ed. 1636; 5th ed. 1673).

GUNTHER, gōōn'tēr. A Burgundian king, in the *Nibelungenlied*, the brother of Kriemhild, and husband of Brunhild, whom he won with the assistance of Siegfried. He was put to death by his sister Kriemhild.

GUNTHER, or **GUNTHERUS.** A German poet, historian, and theologian, born in the twelfth century. He was long established as a scholiast in South Germany, and became the teacher of Prince Konrad, a son of the Emperor Frederick Barbarossa. About 1215 he entered the Cistercian convent of Pairis, in Alsace. He is the author of the two Latin epic poems *Solymarius* and *Ligurinus*. *Solymarius* was dedicated to Frederick Barbarossa in 1186, and treats of the First Crusade; but nothing remains of the work except a fragment discovered by Wattenbach in the Cologne Library. The poem entitled *Ligurinus* is considered the greatest mediæval Latin epic of Germany. It consists of six books, and celebrates the achievements of the Emperor Frederick in Northern Italy. The facts upon which it is based are taken largely from the *Gesta Friderici* of Otto von Freising. Apart from its high poetic value, it presents a faithful picture of the conditions of the time.

GÜNTHER, gün'tēr, Albert (1830—). A German-English zoölogist, born at Esslingen (Württemberg). He was educated at the universities of Tübingen, Berlin, and Bonn, and appointed an assistant in the zoölogical section of the British Museum in 1856. In 1875 he was appointed director of the zoölogical section, and in 1895 was superannuated. He founded and became the first editor of the *Record of Zoölogical Literature* in 1864, was a co-editor of the *Annals and Magazine of Natural History*, and contributed the reports on "Shore Fishes," "Deep-Sea Fishes," and "Pelagic Fishes" to the *Voyage of H. M. S. Challenger* (1887-88). In 1878 a medal of the Royal Society was awarded him for his services in the promotion of zoölogical science, and in particular for his researches in herpetology and ichthyology. His publications include: *Medizinische Zoologie* (1858); *Catalogue of the Batrachia Salientia in the Collection of the British Museum* (1859); a similar catalogue of fishes (8 vols., 1859-70); *The Gigantic Land-Tortoises, Living and Extinct* (1877); and an *Introduction to the Study of Fishes* (1880).

GÜNTHER, Anton (1783-1863). A Roman Catholic theologian and philosopher. He was born November 17, 1783, at Lindenau, in Bohemia. He studied law at Prague, but turned later to reading for orders, became a priest in 1820, and after 1824 lived in Vienna, where he died February 24, 1863. His life studies were directed to reconstructing Catholic dogmatics as a rational science, aiming to settle once for all the ancient strife between reason and religion. Inasmuch as all his attempts to reach this goal by means of pure reason resulted in pantheism, which he saw to be irreconcilable with the doctrines of his Church, he sought to solve his difficulties by an appeal to inner experience and self-consciousness. Thus gradually arose his theologico-speculative system first presented in his *Vorschule zur spekulativen Theologie des positiven Christentums* (1828). In his *Der letzte Symboliker* (1834) the Tübingen tendencies are attacked. By these and similar works, Günther gained numerous adherents, whose 'Young Catholicism' spread through Germany and Austria. Günther received and declined a call to the University of Munich, preferring to remain a priest, although his collected works were put on the *Index Librorum Prohibitorum* in 1853. His collected works appeared in Vienna in 1882. For his life, consult Knoodt (Vienna, 1881).

GÜNTHER, Johann Christian (1695-1723). A German lyric poet, born at Striegau. He was the most gifted poet of an unpoetic generation, but wasted his genius in dissipation. At twenty-two he won recognition by a poem on the Peace of Passarowitz (1718). His later vagabond lyrics are marked by more sincerity and freedom, cleverness and imagination than were common in his time, but they were as unconventional in morals as in treatment. Goethe put Günther among those from whom he got his first lyric inspiration. Günther's poems (1742) are edited by Fulda in Kürschner's *Deutsche Nationallitteratur*, vol. xxxviii., by Tittmann (1874), and by Litzmann (in *Reclams Universal-Bibliothek*). Consult: Kalbeck, *Neue Beiträge zur Biographie des Dichters Christian Günther* (Leipzig, 1879); and Litzmann, *Zur Textkritik und Biographie Johann Christian Günthers* (Frankfort, 1880).

GÜNTHER, Johann Heinrich Friedrich (1794-1858). A German veterinary surgeon, born at Kelbra, and educated at Jena and Berlin. He was director of the Veterinary College at Hanover from 1847 until his death. From 1821 to 1835 he devoted himself chiefly to the healing of contractures. He adopted the subcutaneous method of operating in 1835, and after 1846 collaborated with his son on dental diseases. Their treatise, entitled *Ueber gesunde und kranke Zähne des*

Pferdes, an appendix to *Die Beurteilungslehre des Pferdes* (1859), was the first valuable contribution to the pathology of dental disease in animals. His investigations on veterinary diseases, particularly those on pulmonary affections, are very important. His principal works include: *Lehrbuch der praktischen Veterinargeburtshilfe* (1830); *Das Gangwerk der Pferde* (1845); and *Lupinenbau* (1857).

GÜNTHER, KARL WILHELM ADALBERT (1822-96). A German veterinary surgeon, son of the preceding, born at Hanover and educated there and at Berlin. From 1847 until 1880 he was the principal teacher in the veterinary school at Hanover, where he was appointed professor in 1867, and director in 1870. He was an expert anatomist, and one of the best veterinary operators of his time. His works include: *Topographische Myologie des Pferdes* (1866); *Die Wutkrankheit der Hunde* (1880); *Das Kapaunen der Hahne* (1890); *Studien über das Kehlkopfpfeifen der Pferde* (1894).

GÜNTHER, SIEGMUND (1848—). A German mathematician and geographer. He was born in Nuremberg, was educated at Erlangen, Heidelberg, Leipzig, Berlin, and Göttingen, and in 1886 became professor of geography in the School of Technology in Munich. His contributions to mathematics have been largely historical and geographical, and in these lines they are valuable. They include the following: *Lehrbuch der Determinantentheorie* (1875; 2d ed. 1877); *Vermischte Untersuchungen zur Geschichte der mathematischen Wissenschaften* (1876); *Der Einfluss der Himmelskörper auf Witterungsverhältnisse* (1876; 2d ed. 1884); *Grundlehren der mathematischen Geographie und Astronomie* (1878; 3d ed. 1893); *Die Lehre von den gewöhnlichen und verallgemeinerten Hyperbelfunktionen* (1881); *Parabolische Logarithmen und parabolische Trigonometrie* (1882); *Lehrbuch der Geophysik und physikalischen Geographie* (1884-85); *Die Meteorologie ihrem neuesten Standpunkt gemäss dargestellt* (1889); *Handbuch der mathematischen Geographie* (1890); *Lehrbuch der physikalischen Geographie* (1891).

GÜNTHER VON ANDERNACH, fôn än′dĕr-näg, JOHANN (1487-1574). A German physician, born in Andernach, Rhenish Prussia. He was educated at Utrecht and Marburg, became professor of Greek at Louvain, and subsequently took his doctorate in medicine at Paris. There he became physician to Francis I. Obliged, as a Protestant, to flee the city, he established himself at Strassburg, where he achieved distinction as a physician and anatomist. His published works include *Anatomicarum Institutionum Libri Quattuor* (1536).

GUN′TON, GEORGE (1845—). An American social economist, editor, and author. He was born in Cambridgeshire, England, immigrated to the United States in 1874, and was active from 1874 to 1880 as a writer on economic and allied topics. Subsequently he was connected with economic, sociological, and scientific work, and in 1890 became president of the Institute of Social Economics. From 1890 he was also editor of the *Social Economist*, the name of which was changed in 1896 to *Gunton's Magazine*. In 1899 he was appointed director of the economic and sociological work of the Young Men's Christian Association in North America. His publications include *Principles of Social Economics* (1891) and *Trusts and the Public* (1899).

GUP′PY, WILLIAM. A weak young clerk in the office of Kenge & Carboy, in Dickens's *Bleak House*, who is hopelessly smitten with the charms of Esther Summerson.

GURA, gōō′rä, EUGEN (1842—). A German barytone singer. He was born at Pressern, Bohemia, and after studying music at Munich, made his first appearance at the Court Theatre in that city in the rôle of Count Liebenau, in Lortzing's opera *Der Waffenschmied*. He subsequently sang at Breslau, Leipzig, Hamburg, and London, and in 1883 became a member of the Munich Opera. Although at first excelling in rôles such as Nelusco, Tell, the Templar, he subsequently devoted himself more exclusively to the interpretation of Wagnerian parts, and frequently played the parts of Hans Sachs, King Marke, Amfortas, Telramund, and other Wagnerian characters at the Bayreuth festivals.

GURAMAI, gōō-rä′mī. A river fish of Southeastern Asia (*Osphromenus olfax*), which reaches a weight of twenty pounds, and is regarded as the best-flavored food-fish of its region. Hence it has been naturalized in India, Australia, and elsewhere. The word is variously spelled.

GUR′JUN (East Indian name) **BALSAM,** GURJUN OIL, or WOOD OIL. A limpid, dark-brown balsamic liquid, obtained from the gurjun tree, growing on the Burma coast, East India. It is used medicinally for checking leprosy, and sometimes as a substitute for copaiba. In the arts it is chiefly employed as a varnish for wooden articles. It may be distinguished from the balsam of copaiba by applying heat: at 132° C. (270° F.), gurjun balsam coagulates, while copaiba remains liquid.

GURKHAS, gōōr′kaz (from Skt. *gōrakṣa*, cowherd, from *gāu*, cow + *rakṣa*, guard, from *rakṣ*, to protect), or GOORKHAS. A Hindu race of supposed Rajput origin, inhabiting Nepal, a State situated on the southern slope of the Himalayas, between Tibet and British India, which they first invaded about the twelfth century A.D., and where they have been permanently settled since the latter half of the eighteenth century. An attempt to extend their power farther south brought them into conflict with the British in the Gurkha War of 1814, which ended in the Treaty of Segauli, and clearly defined their territorial limits. They are now a part of the Indian Empire, and supply its army with a corps of infantry renowned for its loyalty and bravery. Their war record began with the Indian Mutiny in 1857, during which they remained loyal, and rendered invaluable service to the British—a record maintained throughout the Afghan wars and the many smaller frontier expeditions since that time. In 1900 they formed part of the British contingent in the international campaign in China. In physique the Gurkha is very short and stout; a natural infantryman and an instinctive foe of cavalry, whose horses he is an adept at hamstringing. In addition to the ordinary equipment of the native soldier, he has a number of knives peculiar to his race, and a quoit-shaped weapon carried on the turban, the outer edge of which is exceedingly sharp, and often effective when the weapon is hurled, quoit fashion, at an enemy. The Gurkha troops number

about 20,000, and are greatly valued by the British Government. See NEPAL.

GURKO, gōōr'kō, OSSIP VLADIMIROVITCH (1828-1901). A Russian general. He entered the army as cornet of the Hussars of the Imperial Guard, was made a captain in 1852, and in this capacity served in the Crimean War. In 1857 he was assigned to the command of his old regiment of the Guards, and in 1860 was made an aide-de-camp of the Emperor. His next promotion was to a colonelcy, in which capacity he served in the campaign of Poland in 1863. In 1867 he was a major-general in the suite of the Emperor, and assigned to the command of a brigade in the second cavalry division of the Guards. In 1876 he was given the command of the same division. At the opening of the war with Turkey he led the Russian advance across the Danube, and occupied Tirnova, July 7, 1877. At the head of a large force, composed chiefly of cavalry, Gurko passed the Balkans, moved rapidly on Adrianople, advancing within two days' march of that city. He was, however, defeated by Suleiman Pasha at Eskizagra and compelled to fall back to the Shipka Pass, which he held against repeated attacks. In October he was sent to operate in the rear of Osman Pasha's forces at Plevna, and took Gorny Dubnik and Telish. In December he advanced again across the Balkans and occupied Sophia, January 4, 1878. He defeated Suleiman Pasha in a three days' battle near Philippopolis, January 15th-17th. In 1879 he became Governor-General of Saint Petersburg, but was removed in the following year. From 1883 to 1894 he was Governor-General of Poland, retiring in the latter year with the title of field-marshal. He died January 28, 1901.

GURLEY, RALPH RANDOLPH (1797-1872). An American philanthropist. He was born in Lebanon, Conn., and graduated at Yale in 1818. Beginning in 1822, he was for half a century agent and secretary for the American Colonization Society. He visited Africa three times in the interest of the negroes, and aided in establishing Liberia. He edited the *African Repository*, and published a *Life of Jehudi Ashmun* (1839) and *Life and Eloquence of Rev. Sylvester Larned* (1844).

GURLITT, gōōr'lit, CORNELIUS (1820-1901). A German composer. He was born at Altona, near Hamburg, and studied under the elder Reinecke (composition), and subsequently with Weyse at Copenhagen. In 1864 he became organist of the Altona Hauptkirche, and during the Schleswig-Holstein campaign was appointed army musical director, after which he became a member of the faculty of the Hamburg Conservatory. In 1874 he was appointed royal musical director. His compositions include several operas and operettas, string quartets, violin sonatas, 'cello sonatas, vocal duets, and songs. His operas had but a local significance, and while his string compositions are more generally known, his claim to fame will rest on his pianoforte compositions, and particularly on his instructive pieces, which are used throughout the civilized world.

GURLT, gōōrlt, ERNST FRIEDRICH (1794-1882). A German veterinary surgeon, born at Drentkau, near Grünberg, Silesia, and educated at Breslau. He was professor of the School of Veterinary Surgery at Berlin from 1826 to 1870, and also director of the technical department of that institution during the last twenty years of his life. He may be said to have been the founder of that branch of anatomical science which treats of the organic structure of the domestic animals, and his investigations on animal deformities are especially noteworthy. His principal publications include: *Handbuch der vergleichenden Anatomie der Haussäugetiere* (7th ed. 1890); *Lehrbuch der pathologischen Anatomie der Haussaugetiere* (with 35 plates, 1831-32); *Lehrbuch der vergleichenden Physiologie der Haussaugetiere* (3d ed. 1865); *Anatomy of the Horse*, English translation by J. Willimott (35 plates, 1833).

GURLT, ERNST JULIUS (1825—). A German surgeon, son of the preceding, born in Berlin. He was appointed professor at the university in that city in 1862. His writings on medical statistics are especially valuable. His principal publications include: *Leitfaden für Operationsübungen am Kadaver* (7th ed. 1889); *Zur Geschichte der internationalen und freiwilligen Krankenpflege im Krieg* (1873); *Die Gelenkresektionen nach Schussverletzungen* (1879).

GUR'NAH. See KURNAH.

GUR'NARD (connected with OF. *gournauld, gournant, grougnant*, from *grognard*, grunter, from *grongner*, Fr. *grogner*, to grunt; so called in allusion to the sound made by the fish when taken from the water). Any of the marine spiny-

AN AMERICAN GURNARD (*Prionotus Carolinus*).

rayed fishes of the family Triglidæ. The head in the gurnards is angular, and wholly covered with bony plates; the body is elongated, nearly round, and tapering. There are two dorsal fins. The lower three rays of the large pectoral fins are detached and elongated into long feelers, which are used mainly in search for food. Many gurnards are distinguished for their beauty of color. They live on the bottom, some at considerable depths, in which case they have a red color. The red gurnard of the British coast (*Trigla cuculus*) is the most common of many European species, and takes its name, 'red crooner' or 'cuckoo' gurnard, from the note it utters when lifted out of the water; another species is called 'piper.' In the United States these fishes are better known as 'sea-robins.' The most common one (*Prionotus Carolinus*) is found abundantly on the east coast from Maine to South Carolina. There are many other species. The flying gurnard (*Cephalacanthus volitans*) occurs in the Atlantic on both coasts. (See FLYING FISH.) The gurnards are known by various other names, such as 'batfish' and 'sea-swallows.' The maximum size is 18 inches. They are regarded as good food-fishes in the Old World, in spite of their uncouth appearance, but in the United States are little used as food.

GURNEY, EPHRAIM WHITMAN (1829-86). An American educator, born in Boston, Mass. He graduated at Harvard in 1852, was tutor in

Latin there from 1859 to 1863, and in 1863-67 assistant professor of Latin. In 1868 he became assistant in history, in 1869 university professor of history, and in 1886 McLean professor of history. He was editor of the *North American Review* from 1868 to 1872, and dean of Harvard from 1870 to 1876. In 1860 he was elected a member of the American Academy of Arts and Sciences. As an academic lecturer he was exceedingly able.

GURNEY, Sir Goldsworthy (1793-1875). An English inventor, born in Cornwall. He was probably the first to devise the oxyhydrogen blowpipe, the so-called Drummond light, and the first to produce and employ the high-pressure steam-jet for purposes of rapid locomotion. In 1827 he built a steam-carriage, in which he made a journey of 85 miles in ten hours. He was knighted in 1863. He published a *Course of Lectures on Chemical Science Delivered at the Surrey Institution*, and several other works.

GURNEY, Joseph John (1788-1847). An English Quaker, prominent as a philanthropist and reformer. He was born at Earlham Hall, near Norwich, was educated privately at Oxford, and, in 1818, became a minister of the Society of Friends. His life was devoted to the prosecution of benevolent enterprises, to many of which he also made liberal gifts. He coöperated with his sister, Mrs. Elizabeth Fry, in prison reforms, and with Clarkson, Wilberforce, and Sir Thomas Fowell Buxton (his brother-in-law) in the advocacy of the abolition of slavery. He made a number of visits to various European countries and to the United States in the interest of the Society of Friends, and in the United States spoke frequently in public in favor of the abolition of slavery and capital punishment. Among his numerous works are: *Observations on the Distinguishing Views and Practices of the Society of Friends* (1824); and *A Winter in the West Indies Described in Familiar Letters to Henry Clay of Kentucky* (1840). Consult: Braithwaite, *Memoirs of Joseph John Gurney* (3d ed., London, 1902); and Mrs. Geldart, *Reminiscences of a Good Man's Life* (1853).

GUROWSKI, gōō-rōv'skē, Adam, Count (1805-66). A Polish author, long resident in the United States. He was expelled from Polish schools in 1818 and in 1819, for having taken part in revolutionary demonstrations, and subsequently studied in Germany. He returned to Warsaw in 1825, however, and had a share in the insurrection of 1830, after the failure of which he fled to Paris, where he joined the Polish committee. In 1835 he published *La vérité sur la Russie*, a work advocating Panslavism, which was so favorably received in Russia that he was recalled and employed in the Russian civil service, though his confiscated estate was not restored. In consequence of opposition to him at court, he left the country in 1844, studied at Heidelberg, taught at Bern, Switzerland, and in 1849 came to the United States. He was for several years engaged in active literary work, and from 1861 to 1863 was employed as a translator in the State Department of Washington. He published: *La civilisation et la Russie* (1840); *Pensées sur l'avenir des Polonais* (1841); *Aus meinem Gedankenbuche* (1843); *Die letzten Ereignisse in den drei Theilen des alten Polen* (1846); *Le Panslavisme* (1848); *Russia As It Is* (1854); *The Turkish Question* (1854); *A Year of the War* (1855); *America and Europe* (1857); *Slavery in History* (1860); and a diary of notes on the Civil War.

GUR'TEEN, Stephen Humphreys Villiers (1840-98). An American clergyman, born at Blean House, near Canterbury, England, and educated at Cambridge, and subsequently at Paris and Berlin. He was professor of Latin at Hobart College, held rectorates at Buffalo, N. Y., and at Toledo, Ohio, and was dean of Saint Paul's Cathedral, Springfield, Ill. His publications are chiefly devoted to the discussion of English charity organization, which he was instrumental in introducing into the United States. They include: *What Is Charity Organization?* (4th ed. 1882); *How Paupers Are Made* (1883); *Handbook of Charity Organization* (1882); and *Beginnings of Charity Organization in the United States of America* (1894).

GURTH. A swineherd and bondsman of Cedric the Saxon, in Scott's *Ivanhoe*.

GUR'TON, Gammer. See Gammer Gurton's Needle.

GURU, gōō'rōō (Skt., teacher). A spiritual guide or teacher among the Hindus. The title was applied to a religious preceptor from whom a youth received initiatory instruction, and who conducted the necessary ceremonies up to the time when the lad was invested with the sacred cord, as described in detail in Manu and the other law books. The guru not infrequently possesses considerable temporal power, as, for example, in Nepal (q.v.). Among the Sikhs (q.v.) the guru was at first the spiritual guide, but came in time to be practically the temporal ruler or leader, while the teaching was done by the other priests, who acted as guardians of the sacred books.

GURY, gü'rē', Joseph Pierre (1801-66). A French Roman Catholic theologian. He was born at Mailleroncourt, and at the age of twenty-three entered the Society of Jesus. After teaching at various Jesuit colleges, he became professor of moral theology at Vals. His principal works, the *Compendium Theologiæ Moralis* (4th ed. 1868; German trans., 1869), and *Casus Conscientiæ in Præcipuas Quæstiones Theologiæ Moralis* (1865), gave rise to considerable polemical discussion. They have been frequently republished in France, Germany, and elsewhere, and have also been used as text-books.

GUSECK, gōō'sēk, Bernd von. The pseudonym of the German novelist and military writer Karl Gustav von Berneck (q.v.).

GUSSENBAUER, gü'sen-bou'ēr, Karl (1842-1903). An Austrian surgeon. He was born at Ober-Vellach, Carinthia, and was educated at Vienna, where for some time he was assistant to Billroth. In 1875 he was appointed professor of surgery at Liège, in 1878 he was made professor at Prague, and in 1894 he became professor of surgery in Vienna. He was the first to construct a serviceable artificial larynx. His researches were devoted chiefly to gastrotomy, removal of the larynx, partial intestinal resection, and methods of artificial bone-severance. His principal works include: *Die traumatischen Verletzungen* (1880); *Sephthämie, Pyohämie und Pyo-Sephthämie* (1882), and *Beitrag zur Extirpation von Beckenknochengeschwülsten* (1891).

GÜSSFELDT, gus'felt, PAUL (1840—). A German explorer. He was born in Berlin, and was educated at Heidelberg, Berlin, Giessen, and Bonn. When the first expedition was sent out by the German African Society in 1872, he was chosen its leader. The expedition sailed to the coast of Loango, but was shipwrecked near Freetown, Liberia, January 14, 1873, and lost all its stores and equipments. Although Güssfeldt succeeded in establishing a station on the coast, he was unable to penetrate into the interior, and returned to Germany in the summer of 1875. In 1876 he visited Egypt and the Arabian Desert (with Schweinfurth), and afterwards explored a portion of the Andes, where he discovered a number of glaciers in latitude 34° 30′ S. He also ascended to the top of the volcano of Maipo, and reached almost the summit of Mount Aconcagua, the highest peak of South America. In 1892 he became professor of physical geography in the seminary for Oriental languages in Berlin. Among his principal works are the following: *In den Hochalpen. Erlebnisse aus den Jahren 1859-85* (3d ed. 1893); *Kaiser Wilhelms II. Reisen nach Norwegen in den Jahren 1889-92* (1892); *Die Loangoexpedition*, jointly with Falkenstein and Pechuel-Loesche (1879 et seq.).

GUSTA'VIA. The capital of Saint Bartholomew (Saint-Barthélemy) (q.v.), a French island of the West Indies. It is on the southwestern coast, and has a good harbor.

GUSTAV'US I. VASA (1496-1560). King of Sweden from 1523 to 1560, and founder of the royal House of Vasa. He was born at Lindholm, May 12, 1496, and was known in private life as Gustavus Ericsson. The name Vasa came into use after his accession to the throne, being derived, it is conjectured, from a black fascine in his arms, which was drawn so that it resembled a vase, and was changed to yellow by Gustavus, giving it the appearance of a sheaf. His father, Erik Johansson, was a patriotic member of the Swedish nobility who followed the Stures in the struggle of the Swedes for independence from Denmark. The young Gustavus began his studies at Upsala in 1509, and five years later entered the service of the Regent Sten Sture, distinguishing himself by gallantry in the battle of Bränkyrka, in which Sture defeated the forces of Christian II. of Denmark (1518). After the battle Christian sought an interview with Sture, and asked that six hostages be given for his safety. Gustavus was chosen as one of these hostages. As soon as they were on board the Danish ship it sailed away to Denmark, where the hostages were held in captivity. From this captivity Gustavus escaped to Lübeck in 1519, and returning to Sweden, finally found a refuge among the loyal peasantry of Dalecarlia, for the death of Sture in 1520 had given the country over to the Danes. In Dalecarlia he wandered for several months, in poverty and disguise, with a price set on his head. In November, 1520, ninety of the nobles and leaders of Sweden who had been summoned to attend the coronation of Christian II. were faithlessly beheaded. Among them were the father and the brother-in-law of Gustavus. The young fugitive vainly attempted to rouse the inhabitants of Dalecarlia to revolt, and was forced to seek refuge in the less frequented parts of the country, where for a month he earned his living as a field laborer, and more than once owed his life and safety to the generosity of the peasant women of the district. This period of his life has been so long made the subject of romance that it is difficult now to separate the true from the false. Not until his account of the tyranny of the Danes was corroborated by the testimony of several fugitives from Stockholm was the national enthusiasm roused, and the men of Dalecarlia, at Mora, on Christmas eve, 1520, proclaimed him head of their own and other communes in Sweden. His first victories over the Danes brought recruits in large numbers. He defeated the Swedes at Westerås, took Upsala, and on August 24, 1521, was proclaimed Administrator of the Kingdom of Sweden. In June, 1523, the Swedish Diet at Strengnäs declared the union with Denmark dissolved, and proclaimed Gustavus Ericsson King of Sweden. Two weeks later he made his triumphant entry into Stockholm.

The King early showed his determination to favor the Lutheran doctrines, and, without attempting to force his subjects into an unwilling change of ecclesiastical alliance, he gradually, by patience and tact, established Lutheranism as the religion of the State, and placed Sweden unalterably in the ranks of Protestant countries. This was finally accomplished and legalized in the Diet at Westerås in 1527, and a national council held at Oerebro in 1529. His attitude toward the Reformation was largely influenced by his desire to overthrow the power of the Catholic clergy, which he considered dangerous to the royal authority and the cause of Swedish independence. The problems of government he had to encounter were many. The young King found a country divided into factions, poor, and with almost wholly undeveloped resources, and wasted by barbarous wars. He devoted himself with fine patience and moderation to the task of developing and reorganizing it. He had owed much to the devotion of the peasantry, while in the proud and turbulent nobility, many of whom belonged to the Danish and Catholic factions, he saw a grave menace to stable government. He therefore sought to give the peasantry better opportunities and fuller participation in the national life, and to limit the dangerous power of the nobles. He was a practical business man as well as a large-minded statesman, and he fostered the commerce, mining, and fisheries of the kingdom with the most careful personal attention, even as to details. Land was reclaimed, hydraulic works were constructed, and sawmills built. He was equally shrewd in his personal affairs, and accumulated a large fortune by agricultural operations. The reforms in the State were not accomplished without great difficulties. The King had to meet disaffection and revolt; he carried on war with Lübeck and the Hansa towns. After forty years' rule Gustavus left Sweden a peaceful and civilized realm, with a full exchequer, a well-organized army of 15,000 men, and a good fleet. He made commercial treaties with foreign nations, and established fairs for foreign traders. Roads and bridges were made in every part of the country, and canals begun. In his relations with his subjects Gustavus was firm, and sometimes severe, but seldom unjust, except in his dealings with the Catholic clergy, whom he despoiled with something like rapacity of all their lands and funds. He did much to promote the cause of Lutheranism, although he took care that the Reformed

clergy should be dependent on the Crown and enjoy only very moderate emoluments. He was three times married, and had ten children. By an act of the Diet of 1544, at Westeras, the crown was declared hereditary in the male descendants of Gustavus; in conformity with which, his eldest son, Eric (see ERIC XIV.), succeeded to the throne on his father's death, September 29, 1560. Consult: Geijer, *Geschichte Schwedens*, vol. ii. (Hamburg, 1834); Watson, *The Swedish Revolution Under Gustavus Vasa* (Boston, 1889), which contains a good bibliography. See SWEDEN.

GUSTAVUS II. ADOLPHUS (1594-1632). King of Sweden from 1611 to 1632, and one of the greatest generals of modern times. He was born December 9, 1594, and was the grandson of Gustavus Vasa, by his youngest son, Charles IX., at whose death in 1611 he succeeded to the throne. Gustavus was brought up in the Lutheran faith, carefully trained in habits of business, and was one of the most accomplished princes of his age. He was educated under the care of John Skytte, a traveled and accomplished Swede, Von Morner, a German, and James de la Gardie, a Swedish noble of French origin. On his accession to power he found the country involved in wars with Denmark, Russia, and Poland. Two months after his accession Gustavus was declared of age by the Estates and the regency was dissolved. The tasks which confronted him were pressing. It was necessary to wrest a large part of Southern Sweden from the Danes, and to crush the designs of Sigismund of Poland upon the Swedish Crown. To strengthen Sweden for the struggles which this involved, the young King, with the approval of the great Chancellor, Axel Oxenstierna (q.v.), believing that the time had come for a halt in the policy of repression of the nobility, which his father and grandfather had found necessary for the authority of the Crown, sought to secure the hearty coöperation of the nobles, whose privileges he confirmed, holding them in return strictly accountable for loyal service. He sought to unite the classes—nobles, clergy, burghers, and peasants—in a common purpose, the upbuilding of Swedish power. While reorganizing the internal government the King entered upon a war with Denmark, which ended in January, 1613, with the relinquishment of some Swedish districts of Denmark. Gustavus had a clear appreciation of the importance of Russia and of the possible menace to Sweden in Russian aggrandizement, and therefore, after disposing of Denmark, he opened a victorious campaign against Russia. By the peace of Stolbova, February 27, 1617, Russia ceded to Sweden Ingria and Carelia. The boundary of the Swedish territory then included the site of the future Saint Petersburg. The Russian war was but a prelude to that against Poland in which, during eight years of active campaigning (1621-29), Gustavus developed his innovations in the art of war, trained the Swedish armies, which became noted as the best troops of Europe, and brought out that brilliant body of commanders who followed him in his later campaigns and carried out his policy after his death. Gustavus conquered all of Livonia and Courland, and occupied the Duchy of East Prussia, held by Brandenburg as a fief of the Polish Crown. The war against Poland was to prevent the aggrandizement of Sigismund and to compel his recognition of Gustavus as King of Sweden. In a larger sense it was a defensive war, since the ultra Catholic powers—Spain and the Empire—had schemed to use Sigismund as an instrument against the Protestant 'Lion of the North.' Largely through the efforts of Richelieu (q.v.), an armistice for six years was arranged September 16, 1629, on the basis of a full recognition of Gustavus as King of Sweden, and Gustavus was thus left free to take an active part in Germany, where the course of the Thirty Years' War had been steadily against the Protestant princes, and the advance of the Imperialists under Wallenstein (q.v.) was already threatening to establish a new power on the Baltic.

In June, 1630, Gustavus, with an army of about 13,000 men, landed in Germany to aid the Protestants in their struggle against the Catholic League, backed by the power of the Empire. The Swedes soon drove the Imperialists from Pomerania. France, through hatred of the Empire, agreed to furnish Gustavus with a subsidy of 400,000 rix-dollars as long as he maintained an army of 36,000 men. The Protestant Electors of Brandenburg and Saxony, jealous of this new power in Germany, were little inclined to cooperate with Gustavus, but were forced to join the Swedes. On September 17, 1631, Gustavus completely defeated the Imperialists under Tilly at Breitenfeld, near Leipzig, saving the cause of Protestantism just when it seemed threatened with utter destruction. The King now advanced into Franconia, and after allowing his armies to recruit their strength in the rich bishoprics of Würzburg and Bamberg, overran the Palatinate and held a splendid court at Mainz, surrounded by princes and ambassadors. Thence he advanced into Swabia. On April 15, 1632, in the face of Tilly's army, he forced the passage of the Lech, where Tilly was mortally wounded. The road to Vienna was now open to Gustavus, and the Emperor Ferdinand II. in terror recalled his general, Wallenstein (q.v.), who gathered a large army and advanced to meet Gustavus. The two great commanders confronted each other for a time at Nuremberg, before which town Wallenstein occupied an intrenched position, from which Gustavus, who held Nuremberg, attempted in vain to dislodge him. Then the armies moved northward and met at Lützen, southwest of Leipzig. Here, on November 16, 1632, Gustavus fought his last battle. The Swedes won the day, but in the course of the fighting Gustavus fell, mortally wounded. Bernhard of Weimar (q.v.) succeeded to the command of the Swedish army.

Although Gustavus was eminently a warlike king, he made many salutary changes in the internal administration of his country, and devoted his short intervals of peace to the promotion of commerce and manufactures. He was preëminently religious, and his success in battle is perhaps to be ascribed not only to a better mode of warfare and the stricter discipline which he enforced, but also still more to the moral influence which his deep-seated piety and his personal character inspired among his soldiers. The spot where he fell on the field of Lützen was long marked by the Shwedenstein, or Swede's Stone, erected by his servant, Jacob Ericsson, on the night after the battle. Its place has now been taken by a noble monument erected to his memory by the German people on the celebration of the second centenary of the battle, held in 1832. He raised Sweden to a commanding position as the

great power of the North, which she retained for a century, and his brief and brilliant campaign saved the cause of Protestantism in Germany. He was succeeded by his daughter Christina.

BIBLIOGRAPHY. Of especial value for the history of Gustavus Adolphus is the third volume of Geijer's standard *Sveriges Historia*, in the German translation, *Geschichte Schwedens* (Hamburg, 1836). Geijer makes much use of contemporary documents, including the correspondence of the King. Consult also: Droysen, *Gustav Adolf* (Leipzig, 1879), a valuable study by one of the foremost German scholars; Gfrörer, *Geschichte Gustav Adolfs, Königs von Schweden, und seiner Zeit* (Leipzig, 1869), a Catholic presentation; in English, Stevens, *History of Gustavus Adolphus* (New York, 1885), the work of a former United States Minister to Sweden and an interesting product of studies pursued under most favorable conditions; Fletcher, *Gustavus Adolphus* (New York, 1890), in the "Heroes of the Nations" Series; Dodge, *Gustavus Adolphus* (Boston, 1895), a study especially on the military side. See THIRTY YEARS' WAR.

GUSTAVUS III. (1746-92). King of Sweden from 1771 to 1792. He was born January 24, 1746, and succeeded his father, Adolphus Frederick (q.v.), in 1771, at a period when the royal power had almost disappeared before the encroachments of the nobility, and the country was distracted by the strife of the rival political parties known as the 'Hats' and 'Caps.' (See CAPS AND HATS.) Finding that the people, weary of the misrule of the nobles, were ready for any change, Gustavus covertly fomented the general discontent, and having raised a fictitious rebellion, through the agency of his friends and adherents, he collected a large body of troops, on pretense of restoring order, and arrested the council in a body, August 19, 1772. He convoked the Diet, and laid before it a new constitution to which the assembly was compelled to subscribe. A revolution was thus effected without the shedding of blood, and by a stroke of the pen Gustavus recovered all the regal powers that had been gradually lost by his immediate predecessors. He acted with great moderation after this successful coup d'état, and might have long retained the advantages he had gained if his love of display and his wish to emulate the King of France in extravagance and magnificence had not led him into profuse expenditure, which embarrassed the finances; at the same time, the introduction of the manners and usages of Versailles in his Court irritated the national party, while it undoubtedly tended to demoralize the upper classes. In 1788 he entered upon a war with Russia, when that empire was engaged in active hostilities against the Turks, but derived no advantage from the contest. In February, 1789, a Diet at Stockholm conferred extensive powers upon the King in the matters of war and of the civil administration. This incensed still further the turbulent nobility, who saw the royal authority thrive at the expense of the privileges of their class. A conspiracy against the King's life was formed, the leaders being Counts Ribbing and Horn and General Pechlin. On the night of March 16, 1792, Gustavus was mortally wounded by their agent, Anckarström (q.v.), at a masked ball in the opera house which he had himself built. The pistol had been loaded with broken shot, which rendered the wound especially painful, and the King suffered the most dreadful agony for thirteen days before his death. Gustavus was a man of varied learning, and the author of several dramatic works and poems of considerable merit. His writings have been published in a collective form both in Swedish and French. In 1788 Gustavus deposited certain papers in the library of Upsala, which excited much interest from the fact that they were not to be opened for fifty years after his death. Their publication, which was confided to Geijer (q.v.), disappointed the general expectation, as they were found to consist of historical notes and letters of little value. Consult Bain, *Gustavus III. and His Contemporaries, 1746-92* (London, 1894). See SWEDEN.

GUSTAVUS IV. ADOLPHUS (1778-1837). King of Sweden from 1792 to 1809. He was the son of Gustavus III. and was born November 1, 1778. He succeeded his father on the latter's death, March 29, 1792. By his father's will he was to be vested with the actual sovereignty at the age of eighteen. His uncle, the Duke of Sudermania, acted as regent during his minority. Gustavus had all the belief in absolutism and the wrongheadedness which wrought his father's downfall, without the latter's ability. Gustavus rashly entered the coalition against Napoleon, and hatred of the Corsican became the guiding influence of his life. The result of his policy was the occupation of Swedish Pomerania by French troops under Marshal Brune, who took Stralsund and Rügen from the Swedes in 1807, and thus deprived them of the last of their German possessions. The King opened all his ports to English vessels, and thereby involved himself in a war with Russia, which was then the ally of France. The scene of these hostilities was Finland, which was invaded and conquered by Russia in 1808, the Swedes being assisted by an English auxiliary force of 10,000 men, who, however, speedily returned to England when they found that Gustavus intended to send them to Finland. This unfortunate war with Russia, which had been excited entirely through the folly of the King, gave rise to so much discontent in Sweden that a conspiracy was set on foot by several officers and nobles, the object of which was to dethrone the unpopular monarch. He was seized in the palace at Stockholm, March 13, 1809, and made a prisoner, and the powers of government were assumed by the Duke of Sudermania. On May 10th the King was formally deposed by the Diet, and the Duke of Sudermania was chosen King of Sweden as Charles XIII. After wandering for a time from place to place, Gustavus finally settled at Saint Gall, Switzerland, where he died, February 7, 1837, in poverty, having refused to accept a pension from Sweden. Consult: *Memorial du colonel Gustafsson (pseudonym)* (Leipzig, 1829); Kleinschmidt, *Die Irrfahrten Gustavus IV. Adolf von Schweden* (Leipzig, 1888).

GUSTAVUS ADOLPHUS SOCIETY (Ger. *Gustav-Adolf-Verein*). A Protestant society, originating in Germany in 1832, for the purpose of aiding and supporting Protestant congregations. It was formed in Leipzig on the second centennial anniversary of the battle of Lützen, and of the death of Gustavus Adolphus, as a memorial to that champion of Protestantism. Congrega-

tions are aided both in and out of Germany, and contributions are received from many countries, but more especially from Saxony and Sweden. Various women's aid societies are associated with it. Its yearly income is at present some 2,000,000 marks, and it has distributed since its foundation over 30,000,000 marks.

GUSTAVUS VASA, vä'sà. See GUSTAVUS I. VASA.

GÜSTROW, gü'strō. Capital of the circle of the same name in the Grand Duchy of Mecklenburg-Schwerin, situated on the Nebel, 22 miles south of Rostock (Map: Germany, E 2). Its chief public buildings are the thirteenth-century Cathedral of Saint Cecilia, recently restored; the parish church, dating from the sixteenth century and containing Flemish oil paintings and fine specimens of wood-carving; the old castle, now used as a workhouse; the town hall and the theatre. Chief among the educational institutions of the town is the gymnasium, dating from the sixteenth century. Güstrow produces machines and other iron articles, tobacco, soap, sugar, beer, etc. The trade is mostly in wood, grain, and animals. There is also an annual wool fair. Güstrow was founded in the thirteenth century, and was for a long time the residence of different reigning houses. Population, in 1890, 14,568; in 1900, 16,882.

GUTENBERG, gōō'ten-bĕrk, JOHANNES (c.1400-c.1468). The inventor of printing from movable types. He was born at Mainz, of the patrician family of Gensfleisch; the latest investigations tend to fix the date between 1394 and 1399. The name of Gutenberg was taken from a property long supposed to have been brought in by his mother, but discovered by recent researches to have been in the possession of his great-grandfather. The family was expelled from Mainz in 1420 and took refuge in Strassburg, where Gutenberg is found living in 1434, having already acquired some reputation for technical skill. He left Strassburg for Mainz in 1444. Attempts at printing were heard of in various quarters; to carry out his own schemes, Gutenberg in 1450 associated himself with Johannes Fust, a wealthy citizen of Mainz, who supplied the money to set up a press and print the 'forty-two-line' Bible. Fust dissolved the partnership in 1455, and since Gutenberg could not repay his advances, retained possession of the plant, which he improved and used. In this manner, though Gutenberg was known as the inventor throughout the fifteenth century, it was possible to claim the honor for Fust in the sixteenth; but for a century past the Dutch Coster (q.v.) has been the only serious rival of Gutenberg, and the searching investigations carried on in 1900, in connection with the fifth centenary of his birth, have established Gutenberg's claims more firmly than ever.

His commercial success was never large. In 1465 the Archbishop Adolf, of Nassau, gave him a benefice, to which various privileges as well as an income were attached. He died at Mainz toward the end of 1467 or in the beginning of 1468. He has been honored by statues in various German towns, and in 1901 a Gutenberg museum was opened in his native town supported by a society also named after him. Consult: Van der Linde, *Gutenbergs Geschichte und Erdichtung* (Stuttgart, 1878); Börckel, *Gutenberg* (Giessen, 1897); Hessels, *Gutenberg: Was He the Inventor of Printing?* (London, 1882); Meissner and Luther, *Die Erfindung der Buchdruckerkunst* (Bielefeld, 1900).

GUTHE, gōō'te, HERMANN (1825-74). A German geographer, born at Andreasberg in the Harz region, and educated at Göttingen and Berlin, where he was a pupil of Ritter. In 1873 he was appointed to the chair of geography at the Polytechnic Institute, Munich. He fell a victim to the cholera, January 29, 1874. His geographical works include: *Die Lande Braunschweig und Hannover* (2d ed. 1887; 4th abridged ed. 1890); *Lehrbuch der Geographie für die mittleren und oberen Klassen höherer Bildungsanstalten* (6th ed. 1894 et seq.).

GUTH'RIE. A city, the capital of Oklahoma, and the county-seat of Logan County, 32 miles north of Oklahoma City, on Cottonwood Creek, and on the Atchison, Topeka and Santa Fé, the Chicago, Rock Island and Pacific, and the Oklahoma Eastern railroads (Map: Oklahoma, F 3). It was founded in 1889, when the Territory was opened for settlement, and became the capital city in 1890. Later occurred a spirited contest between Guthrie and Oklahoma City (q.v.), the rival cities both developing rapidly. Guthrie has an extensive trade in wholesale merchandise, and among its industrial establishments are cottonseed oil, planing and flouring mills, a foundry and machine-shop, and broom-works. The principal buildings include the Territorial Capitol, Scottish Rite Temple, Carnegie Library (costing $25,000), the city hall, and the Federal prison. Congress has appropriated $50,000 for a Federal building here. The government is vested in a mayor, elected biennially, and a unicameral council which confirms the mayor's appointments of members of the fire department, including the chief, and of the police force, excepting the chief, who is chosen by the people. The city owns and operates its water-works. Population, in 1890, 5333; in 1900, 10,006.

GUTHRIE, FREDERICK (1833-86). An English physicist. He was born at Bayswater, England, and was educated at University School and College, London. He then studied chemistry at Heidelberg and at Marburg, where he received the degree of Ph.D. He subsequently occupied positions at Owens College, Manchester, University of Edinburgh, and the Royal College, Mauritius. In 1869 Guthrie became connected with the Normal School of Science at South Kensington, and lectured there until his death. His early experimental work was for the most part in chemistry, but later he took up physics, and two of his first papers in this field were on "Drops" and "Bubbles." In 1870 he discovered the phenomenon of the attraction of a vibrating tuning-fork for a light suspended body near by, known as "Approach Caused by Vibration," and later investigated the thermal conductivity of liquids, stationary vibration of liquids in various shaped vessels, electrolysis, solution, and melting-points. Guthrie was elected a fellow of the Royal Society of Edinburgh in 1859, and of the Royal Society of London in 1873, in which year he founded the Physical Society of London, whose president he became in 1884. His efforts in promoting and improving elementary science teaching were most successful, and he devised many simple methods and considerable apparatus for

teachers which came into extended use in schools. He was an experimentalist rather than a mathematical physicist, and was thoroughly practical in his teaching and investigations; he was also a student of the modern languages and a man of letters, having published, under the pseudonym of Frederick Cerny, a poem entitled *The Jew* (1863); *Elements of Heat and Non-Metallic Chemistry* (1868); *Magnetism and Electricity* (1875); *Introduction to Physics* (1877); and the *First Book of Knowledge* (1881).

GUTHRIE, George James (1785-1856). An English surgeon, born in London of Scottish parents. He was admitted to membership in the Royal College of Surgeons in 1801. As army surgeon he served in the Peninsular campaign, and his work there won the praise of the Duke of Wellington. In 1816 he began a series of lectures in surgery to the officers of the army and navy, which he continued for nearly thirty years. His principal works are: *On Gunshot Wounds of the Extremities Requiring the Different Operations of Amputation, and Their After Treatment* (6th ed. 1855), and his *Lectures on the Operative Surgery of the Eye* (3d ed. 1838).

GUTHRIE, James (1792-1869). An American lawyer and politician, born near Bardstown, Ky., and educated at McAlister's Academy in that town. He was engaged in the Mississippi River trade for several years, during which he made a number of trips down the river to New Orleans on flat-boats, returning to Kentucky each time on horseback. He then decided to enter the legal profession, studied and began practicing at Bardstown, and removed to Louisville in 1820, on receiving his appointment as commonwealth's attorney. For fifteen years consecutively he served as a member of the State Legislature, for the last six years being a member of the Senate. In 1849 he was president of the State Constitutional Convention, and from 1853 to 1857 was Secretary of the Treasury in the Cabinet of President Franklin Pierce. In 1860 he became president of the Louisville and Nashville Railroad. In the same year he was a candidate for the Presidential nomination at the Democratic National Convention at Charleston, S. C., but when the secession movement began he took his stand as a stanch friend of the Union, and by his exertions contributed much toward keeping Kentucky in the Union. He was a delegate to the Chicago Democratic Convention in 1864, and from 1865 to 1868, when ill health compelled him to resign, was a member of the United States Senate. In 1866 he was a delegate to the National Union Convention at Philadelphia.

GUTHRIE, Thomas (1803-73). An eminent Scottish pulpit orator and philanthropist. He was born July 12, 1803, at Brechin, Forfarshire, where his father was a merchant and banker. He went through the curriculum for the ministry at the University of Edinburgh, and devoted two additional winters to the study of chemistry, natural history, and anatomy. Meanwhile he was licensed as a preacher by the presbytery of Brechin in 1825. He subsequently spent six months in Paris, studying comparative anatomy, chemistry, and natural philosophy. Returning to Scotland, for two years he conducted the affairs of a bank agency in Brechin. In 1830 he became minister of Arbirlot, in his native county; and in 1837 was appointed one of the ministers of Old Greyfriars Parish in Edinburgh. In 1843 Guthrie joined the Free Church, and for a long series of years continued to minister to the large and influential congregation of Free Saint John's in Edinburgh. He came forward in 1847 as the advocate of ragged schools (q.v.), the first of which he himself established. He also earnestly exerted himself, in many ways, in opposition to intemperance and other prevailing vices. He retired from the ministry on account of his health in 1864, and from that time until his death in Saint Leonard's-on-the-Sea, February 24, 1873, he was editor of the *Sunday Magazine*. Guthrie possessed great rhetorical talent, and his style was remarkable for the abundance and variety of the illustrations he used. His most important published works are: *The Gospel in Ezekiel*, a series of discourses (1855); *The Way to Life*, a volume of sermons (1862); *A Plea for Drunkards and Against Drunkenness*, a pamphlet (1851); *A Plea for Ragged Schools*, a pamphlet (1847), followed by a second and a third plea (1848 and 1849), the latter with the former republished under the title of *Seed-Time and Harvest of Ragged Schools* (1860); *The City: Its Sins and Sorrows* (1857). His *Autobiography and Memoir* was published by his sons (London, 1874-75). For his life, consult Smeaton (London, 1900).

GUTHRIE, Thomas Anstey (1856—). An English author (pseudonym, F. Anstey), born at Kensington. After graduating at Cambridge, he was called to the bar in 1880, but immediately took up writing short stories for the magazines. His works include: *Vice Versa* (1882), which was successfully dramatized; *The Giant's Robe* (1883); *The Black Poodle* (1884); *The Tinted Venus* (1885); *The Fallen Idol* (1886); *The Pariah* (1889); *Voces Populi* (1892); *The Travelling Companions* (1892); *Under the Rose* (1894); *Lyre and Lancet* (1895); *The Statement of Stella Maberly* (1896); *Paleface and Redskin* (1898); and *The Brass Bottle* (1900). Many of his recent stories have first appeared in *Punch*.

GUTHRIE CENTRE. A town and the county-seat of Guthrie County, Iowa, 59 miles west of Des Moines, on the South Coon River and on the Chicago, Rock Island and Pacific Railroad (Map: Iowa, C 3). It has some manufactures and is surrounded by a farming and stock-raising district. The water-works are owned by the municipality. Population, in 1890, 1037; in 1900, 1193.

GUT MANUFACTURE. See Catgut; Gold-Beaters' Skin.

GUTNIC, gōōt'nīk, or **GUTNISH**. The dialect of the island of Gotland in the Baltic, forming, with Swedish and Danish, the philological group known as East Norse. It is preserved in runic inscriptions extending from the seventh to the sixteenth century, and also in several fourteenth century manuscripts.

GUTSCHMID, gōōt'shmīt, Alfred von (1831-87). A German historian, born at Loschwitz, Saxony. He was educated at Leipzig and Bonn, and held the chair of history at the universities of Kiel, Königsberg, Jena, and Tübingen. His writings, mostly on the history of Greece and Persia, and on ancient chronology and annalism, include: *Untersuchungen über die Geschichte des Konigreichs Osroëne* (1887), and *Geschichte Irans*

und seiner Nachbarlander von Alexander dem Grossen bis zum Untergang der Arsaciden (1888).

GUTSMUTHS, goots'moots, JOHANN CHRISTOPH FRIEDRICH (1759-1839). A German pedagogue and co-founder of German athletics. He was born at Quedlinburg, and after studying theology under Semmer, Niemayer, and Knapp at Halle, became preceptor in the parental home of the renowned geographer Karl Ritter, upon whose development Gutsmuths exercised a powerful influence. He subsequently became instructor in various branches, but more especially in athletics, technology, and geography, in the newly established educational institution at Schnepfenthal, where he remained for more than fifty years. He may, perhaps, be said to have been the first in Germany to systematize the study of geography and to make it interesting. He also ranks as one of the chief promoters of athletics, on which subject he published the following works: *Gymnastik für die Jugend*, the first German text-book on gymnastics (latest ed. 1893); *Spiele für die Jugend* (8th ed. 1893). His *Handbuch der Geographie* (4th ed. 1826) was also important in its day.

GUT'TÆ (Lat., drops). Pendent ornaments attached to the under side of the mutules (q.v.), and to the band under the triglyphs of the Doric order. They are in the form of the frustum of a cone or are cylindrical. They are obviously reproductions in stone of pegs or nails, which had a practical purpose in the wood and clay structures from which the Doric style was developed, but in the stone buildings have become merely ornamental.

GUT'TA-PER'CHA (Malay *getah*, gum + *percha*, name of a tree). A substance in many respects similar to caoutchouc, and consisting of the dried milky juice of certain trees and climbers, the best being obtained from the Isonandra gutta, which is found in the peninsula of Malacca and the Malayan Archipelago. The tree belongs to the natural order Sapotaceæ. It is a very large tree, the trunk being sometimes three feet in diameter, although it is of little use as a timber-tree, the wood being spongy. The leaves are alternate, on long stalks, obovate-oblong, entire, somewhat leathery, green above, and of a golden color beneath. The flowers are in little tufts in the axils of the leaves, small, each on a distinct stalk, the corolla having a short tube and six elliptical segments; they have twelve stamens and one pistil. Other trees producing good gutta are found in Cochin-China, Venezuela, Costa Rica, and Australia. In 1860 vast forests of gutta-percha trees were found in Guiana, and many varieties of the tree flourish in the luxuriant forests of Brazil. An inferior quality is obtained from trees and climbers in Africa and Madagascar. There is also a variety known as *caoutchouc gutteux*, which combines many of the characteristics of gutta-percha and india-rubber. The gutta-percha of commerce comes chiefly from the Sunda Islands, Cochin-China, Cambodia, and Hindustan, Singapore being the chief shipping port. The different varieties on the market are designated by the place where they grew, the best being that coming from Macassar and Sarawak.

The present mode of obtaining the gutta-percha is a most destructive one, and attempts are being made in many countries to regulate by legislation the collection of the juice. The finest trees are selected and cut down, and the bark stripped off; between the wood and bark, a milky juice is found, which is scraped up into little troughs made of plantain-leaves. The milk, as it flows from the tree, is snow-white, but darkens on being exposed to the air. Like rubber, a thick cream forms on the top of the milk when allowed to stand. This is removed, molded into cakes, and thrown into boiling water, from which it emerges ready to be shipped. Unfortunately, the gatherers do not hesitate to mix earth or other impurities in the cake to add to its weight, so that it is difficult to obtain the pure article.

It is imported in blocks and lumps of five to ten pounds weight, in various forms, chiefly large cakes, or rounded into gourd-like lumps. It has a very light, reddish-brown, or almost a flesh color, and is full of irregular pores elongated in the direction in which the mass has been kneaded. It has a cork-like appearance when cut, and a peculiar cheese-like odor. Before it can be used, it has to undergo some preparation. This consists in slicing the lumps into thin shavings, which are placed in a deviling or tearing machine revolving in a trough of hot water. This reduces the shavings to exceedingly small pieces, which, by the agitation of the tearing teeth, are washed free from many impurities, especially fragments of the bark of the tree, which, if not separated, would interfere with the compactness of its texture, which is one of its most important qualities. The small fragments, when sufficiently cleansed, are kneaded into masses which are rolled several times between heated cylinders, which press out any air or water, and render the mass uniform in texture. It is then rolled between heated steel rollers into sheets of various thickness for use, or is formed into rods, pipes, or tubes. Hollow tubes are made in a machine similar to that which is used for making macaroni. Sometimes *caoutchouc gutteux* is mixed with the gutta-percha to make it more supple, or india-rubber to make it more elastic.

Gutta-percha was known in Europe long before its peculiar character and possible uses were understood. It was from time to time brought home by voyagers, in the form of drinking-bowls, which excited much curiosity on account of the material of which they were made. Some thought it a species of india-rubber; others asserted it to be a kind of wood, which they named *mazer wood*, from its use in making these drinking-cups.

Gutta-percha is now turned by surgeons to various uses, chiefly for splints and covering moist applications to retard evaporation. A splint of gutta-percha is made by taking a rigid board of the substance cut to the desired shape, soaking it in hot water, and then bandaging it to the limb. In a few minutes the gutta-percha is found hard, and modeled to the shape of the parts. Gutta-percha being readily soluble in chloroform, such a solution is sometimes used for covering raw surfaces, as when the chloroform evaporates it leaves a pellicle of solid gutta-percha. It is also used in dentistry. It softens in warm water, and can be molded into any form in that state, as when soft it is not sticky, and turns well out of molds. It will always be of great value as a material in which to take casts, as it can in the soft state be made to take the sharpest forms most faithfully; and as it quickly becomes hard, and preserves its shape, if not too thin, the range of its utility in this

respect is very extensive. Golf-balls are made of gutta-percha.

Gutta-percha is supple, flexible, and very tenacious and extensible, so that it may be drawn out to many times its length and retain almost all the extension. It is insoluble in water and dilute acids; it resists alkalies and hydrofluoric acid, so that the latter may be contained in bottles or other receptacles made of or coated with gutta-percha. Gutta-percha is used for making a vast variety of ornamental and useful articles; but its most important application is for the insulating coating of submarine conductors. In this application, as in most others, its chief defect arises from the readiness with which it becomes oxidized and decomposed. Its great value arises from the ease with which it can be worked, and its being so complete a non-conductor of electricity. Its non-conducting power is not modified by burying it in the ground or plunging it in fresh or salt water. Gutta-percha is used as an insulating material in nearly 200,000 miles of ocean cables, and it is its successful application to this purpose that has made the extensive development of submarine telegraphy possible. From the time when Morse laid his telegraph line in New York Harbor from Castle Garden to Governor's Island, in 1842, using an insulated copper cable, the promoters of submarine telegraphy were seeking for a suitable insulating material. During this time Montgomerie was independently studying the properties of gutta-percha, and it was suggested by Wheatstone, who was unable to put the idea into practice, that it would be a suitable insulating covering for a submarine conductor. This was successfully accomplished about 1848.

Attempts have been made to remedy the defect of gutta-percha of softening in a high temperature by a process of vulcanization similar to that so successfully applied to india-rubber (q.v.), but the results have not been satisfactory.

Gutta-percha differs very materially from caoutchouc or india-rubber in being non-elastic, or elastic only in a very small degree. Notwithstanding this very striking character of caoutchouc, the two articles are often confounded in the public mind, probably from the similarity of their applications. India-rubber is displacing gutta-percha in some of its most important applications, and especially in the coating of both land and marine telegraph cables. See TELEGRAPH, SUBMARINE.

GUT'TA RO'SEA (Lat., red drop). A very old term used to denote a cutaneous eruption sometimes popularly called 'toddy blossoms' from its frequent occurrence in aged drunkards. It is really a form of acne. (See the article on ACNE.) Gutta rosea febrilis is a condition of the nose in certain malignant fevers when that organ becomes purple, swollen, and pustular. It was considered a fatal symptom. Gutta rosea herpetica was applied to eczema of the nose, accompanied by itching, formation of pimples, and blisters, and scaling of the skin. Gutta rosea leprosa was applied to leprosy of the face with pustules. Gutta rosea syphilitica was applied to the corona venerea, or row of papules and pustules appearing on the forehead of a syphilitic patient.

GUTTA SERE'NA (Lat., serene drop). An old name for amaurosis (q.v.).

GUTTER (OF. *gutiere*, Fr. *goutière*, from OF. *gote*, Fr. *goute*, drop, from Lat. *gutta*, drop). An open channel for conveying water from buildings, roads, etc. The Greeks, who constructed their roofs with a simple span, used gutters at the eaves of their buildings, hollowed out of the stone which formed the cornice. These gutters discharged their contents on the ground at intervals through small gargoyles (q.v.), usually in the shape of lions' heads. The Romans followed this example, and also formed gutters with tiles laid in cement. In the Middle Ages the eaves seem to have been left without gutters until, owing to the castles being frequently built on dry, rocky sites, it was found desirable to collect the rain-water and preserve it in cisterns. Stone or wooden eaves, gutters, and pipes were used for this purpose. In ecclesiastical architecture, when the construction became complicated, it was necessary to convey the water from the roofs with great care, so as to prevent damage to the building. It was collected at the eaves of the central roof, and by means of well-projected gargoyles, thrown along channels formed in the crest of the buttresses, and so carried beyond the walls of the building, and thrown off through gargoyles in a number of small streams, which dispersed the water before it reached the ground. This acted well in calm weather, but during storms the water was blown back all over the building, which, in case of its being of a porous stone, softened, and became liable to decay. This led to the use of lead pipes, which carried the water directly to the ground, and discharged it into open gutters. At first, the pipes were used for conveying the water from the main roof to the roof of the side-chapels, whence it was discharged by gargoyles. Pipes conveying the water to the base of the building were first employed in England, where they seem to have come into use during the fourteenth century. They were formed with great taste, and had ornamental cups or cisterns at the top to receive the water from the mouth of the gargoyle. They were then made square in form, not circular, as they usually now are.

The sides of streets next the curbstones, or the ditches along roads, in which the surface water flows, are also called gutters.

GUTTY, or **GUTTÉ** (OF. *goté*, *gotié*, spotted, from Lat. *guttatus*, spotted, from *gutta*, spot). In heraldry, a term used to describe a particular charge on a field, covered with drops. When the drops are red, they are supposed to represent drops of blood. In this case, some great suffering or labor, such as fighting for the recovery of the Holy Land, is supposed to be indicated. Where the drops are blue, they represent tears. When white, they are called drops of water; but it is possible that tears are intended in this case also, and that repentance or penitence is signified by both. A field or charge may also be *gutté de vert*, or green, to represent oil; and *gutté de poix*, or black, to represent pitch. See HERALDRY.

GUTZKOW, gōōts'kō, KARL (1811-78). A distinguished German novelist and dramatist, born in Berlin. He studied theology and philosophy in Berlin and early contributed to literary journals. He subsequently studied law and political sciences at Heidelberg and Munich, but devoted himself exclusively to literature. His early fiction is

satirically skeptical, as is implied in the title of his first significant novel, *Wally, die Zweiflerin* (1835), for which he was imprisoned and all his writings forbidden, with the usual result of making them and him widely popular. This work is usually taken as the starting-point of the school known as Young Germany, literary reformers heralding the democratic upheaval of 1848. After his release from prison Gutzkow went to Hamburg, and wrote four powerful dramas: *Richard Savage* (1839); *Zopf und Schwert* (1844); *Das Urbild des Tartuffe* (1847); *Uriel Acosta* (1848), and others of less merit. In 1847 he went to Dresden as director of the Court Theatre (till 1850), and wrote two remarkable novels, *Die Ritter vom Geiste* (9 vols., 1850-52), and *Der Zauberer von Rom* (9 vols., 1859-61). From 1852 to 1862 he edited the family weekly *Unterhaltungen am häuslichen Herd*. In 1864 he had an attack of insanity, and though after his recovery he continued to write voluminously, he never regained his power. Gutzkow's strong controversial purpose obscured his artistic genius, but his work has profoundly influenced the popular thought of modern Germany, and gives one of the best pictures we have of the intellectual life and the social struggle of his generation and nation. Consult: Prölss, *Das junge Deutschland* (Stuttgart, 1892); Frenzel, *Erinnerungen und Strömungen* (Leipzig, 1890); Houben, *Studien über die Dramen Gutzkows* (Jena, 1899); Caselmann, *Karl Gutzkows Stellung zu den religiös-ethischen Problemen seiner Zeit* (Augsburg, 1900).

GÜTZLAFF, gŭts'läf, Karl F. A. (1803-51). A missionary, historian, and author, born at Pyritz, Pomerania. In the service of the Netherlands Missionary Society, he studied Chinese at Batavia, 1826-28. Severing his connection with the Missionary Society, he went to Singapore, and a few months later to Siam, where he engaged in translating the Scriptures into Siamese. His wife dying in 1831, he went to Macao, where, and later at Hong Kong, he assisted Morrison (q.v.) and Medhurst (q.v.) in translating the Bible into Chinese, and was incessantly active in Gospel labors. In personal appearance, Gützlaff was so like a native that he was able to pass for one when traveling in the costume of the country. His influence as physician and preacher was magnetic. He served for a while as interpreter to the British Government, assisting in the peace negotiations of 1842. He was especially active in raising up a native ministry and in diffusing information in Chinese. He made many voyages in countries near China. On his visit to Europe, his powerful addresses inspired many young men to enter upon Eastern careers, among them G. F. Verbeck (q.v.), Japan, and Sir Harry Parkes (q.v.), China. See his *Journal of Three Voyages Along the Coast of China, with Notices of Siam, Corea, and the Loo Choo Islands* (New York, 1833); *Chinese History* (2 vols., London, 1834); *China Opened* (revised by the Rev. Andrew Reed, 2 vols., London, 1838; a German edition of this work was also published, Stuttgart, 1847); *Life of Taou-Kwang, Late Emperor of China* (1851), besides many learned contributions to periodicals. He died at Hong Kong. One of the ablest and most efficient men in the opening of the East, his services have received scant recognition. A biography of Gützlaff by Gaïhan, *Gützlaff der Missionar der Chinesen*, was brought out at Duisburg in 1850.

GUY, Seymour Joseph (1824—). An English painter, born at Greenwich. He studied under Buttersworth and Ambroise Jerome. In 1854 he removed to New York City, and in 1865 became a member of the National Academy. His works comprise portraits and genre pictures, often scenes from child life, such as: "The Little Sweeper;" "Bedtime Story;" "Making a Train." He paints with great detail and good color.

GUY, Thomas (c.1645-1724). An English philanthropist, the founder of Guy's Hospital in London. He began business as a bookseller on a capital of £200, and it is said that he laid the foundation of his fortune by selling, surreptitiously, Bibles brought into England from Holland. Later he became printer to the University of Oxford, and it was largely owing to him that the universities were able to beat the King's printers, who were trying to drive them out of the publishing business. He was a member of Parliament from 1695 to 1707. In 1678 he gave his first public charity—an almshouse at Tamworth for the accommodation of six poor women. Five years later he enlarged this almshouse so that it could accommodate fourteen men and women. He gave generously to the poor, to release insolvent debtors, and to start young men in business. To relieve the overcrowded condition of Saint Thomas's Hospital, he built three new wards, and then, having acquired a great fortune by the rise of South Sea stock, applied a large part of it to building the hospital which bears his name.

GUYAU, ge'yō'. Jean Marie (1854-88). A French philosopher, born at Laval. His ill health did not lessen his activity, and he produced much before his early death. A critic rather than a constructive scholar, he still advanced the theory that altruism is not artificial, but instinctive, a particularization of his psychological law that instinct tends to be destroyed or diminished as it becomes conscious; and, in ethics, he held that 'I can, therefore I must,' is a truer characterization than 'I must, therefore I can.' Besides contributions to the *Revue des Deux Mondes* and the *Revue Philosophique*, he wrote: *Vers d'un philosophe* (1881); *La morale anglaise contemporaine* (1885); *Esquisse d'une morale sans obligation ni sanctions* (2d ed. 1890); *L'irréligion de l'avenir* (1887); *Education et hérédité* (1889); and *La genèse de l'idée du temps* (1890). Consult the essay in Royce, *Studies of Good and Evil* (New York, 1898); and Lambert, "L'Œuvre sociologique de Guyau," in the *Revue Internationale de Sociologie*, vol. viii. (Paris, 1901).

GUY DE MAUPASSANT, ge dĕ mō'pä'säN'. See Maupassant.

GUY FAWKES, gī fąks. An English conspirator. See Fawkes.

GUY (gī) **MAN'NERING.** A novel by Walter Scott (1815). Hogg is said to have recognized, at once, in the hero, a portrait of the author himself. The leading characters are Dominie Sampson and Meg Merrilies.

GUY OF AREZZO, ä-rĕt'sō. See Guido d'Arezzo.

GUY or **GUIDO** (gwē'dō) **OF LUSIGNAN,** lu'zē'nyäx' (?-1194). A king of Cyprus and Jeru-

salem. He was the son of Hugo VIII. of Lusignan, the head of that family in Poitou. During a journey to the Holy Land he married Sibylla, the daughter of Amaury, King of Jerusalem (1180), and became King himself upon the death in 1186 of Sibylla's son, Baldwin V., by her first husband, the Marquis of Montferrat. In a war which ensued with Saladin, he was defeated and taken prisoner at the battle of Tiberias (1187), and was obliged to give up his kingdom. He was not kept long in captivity, and resumed operations against the Moslems, laying siege to Acre in 1189. He made over his rights to Jerusalem to Richard I. of England, who gave him in payment the island of Cyprus (1192). His four sons were killed at the siege of Acre, so he was succeeded by his brother, Amaury, Count of Jaffa. One of Amaury's descendants married Catarina Cornaro, through whom Cyprus became a part of the Republic of Venice (1489).

GUY OF WARWICK, wŏr′ĭk. The hero of a popular English legend. Guy is represented as the son of Siward of Wallingford. Becoming page to Rohand, Earl of Warwick, he falls in love with the Earl's daughter, named Felice, who declines to marry him until he has proved his knighthood. To this end he makes two expeditions to the Continent, going as far east as Constantinople. He returns to England, slays a dragon, marries Felice, and departs for the Holy Land. Returning to England just at the time when Athelstan is besieged by the Danes at Winchester, he slays in single combat Colbrand, a terrible giant in the Danish Army. He retires to a hermit's cell, where he dies. Scholars have attempted to find at the basis of the legend some historical incident. The fight between Guy and the giant has been doubtfully identified with the battle of Brunanburh (937) between Athelstan and Anlaf the Dane. While this is hardly more than conjecture, it is generally agreed that the legend rests upon English traditions of the tenth and eleventh centuries. It was given literary form by an Anglo-Norman poet of the twelfth century, and from French it passed into English (fourteenth century). From that time on, the story, implicitly believed in all its details, was extremely popular, as is indicated by several Middle English versions. It was printed by William Copland (middle of the sixteenth century); versified incidents from it were recited by minstrels; it was dramatized by Day and Dekker in collaboration; and, reduced to a chap-book, it circulated widely throughout the eighteenth century. Consult: Zupitza, *Zur Litteraturgeschichte des Guy von Warwick* (Vienna, 1873); MSS. of the Middle English versions edited by him for the Early English Text Society (London, 1875-76; 1883-92); and *Speculum Guy de Warwyke*, edited by Morrill for the same society (London, 1898).

GUYON, gē′ŏn′, Jeanne Marie Bouvier de la Motte- (1648-1717). A French writer on mystical subjects. She was born of noble parents at Montargis, April 13, 1648. She wished to enter a convent, but her parents prevailed upon her when not quite sixteen to marry Jacques de la Motte-Guyon, the son of the wealthy contractor who constructed the Canal of Briare, for which he was ennobled. M. Guyon was twenty-two years her senior, and at first had no sympathy with his wife's extreme religious tendencies. Before his death in 1676 he learned to appreciate her goodness. A widow at twenty-eight with five children, she devoted herself to their education for several years. Later she moved to Paris, where, as an attractive wealthy widow, she had many suitors. About 1680, after settling most of her fortune on her children, she went to Geneva for religious work. At this time she fell into melancholic depression, from which her spiritual director, Père Lacombe, aroused her. Madame Guyon followed in her director's footsteps, and wrote a *Short and Easy Method of Prayer* (revised translation, London, 1902), besides commentaries on the Scriptures, which brought her under ecclesiastical censure. While protesting submission, she continued to write and teach as before. Her life after this is a series of persecutions for her religious ideas. She was accused of laying too much stress on faith and the quietude of contemplation rather than good works in the Christian life. Shut up by a royal order in the Convent of the Visitation (1688), she was set free by the influence of Madame de Maintenon, and through her obtained entrance into the highest circles of the French nobility. Fénelon, convinced of her personal goodness, allowed himself to be led into a false position in her defense. (See Fénelon.) Politics became a factor in her condemnation and the severity of her sentence. For a time Madame Guyon was confined in the Bastille, but her virtuous character was acknowledged by the assembly of the French clergy in 1700. She was released from prison, however, only in 1702, and then was banished. She passed the rest of her life in retirement at Blois, where she died June 7, 1717, professing absolute faith in the Roman Catholic Church and its dogmas. Her life has attracted attention partly because of Fénelon's interest in her, and partly because of her persecution by the Church authorities. Frequent allusions in her autobiography would seem to indicate certain manifestations in her case of what would now be called subconscious personality. The imputations made against her moral character in her relations to Père Lacombe are undoubtedly groundless.

Consult: *Œuvres spirituelles de Mme. Guyon* (42 vols., Cologne, 1713-22); Guerrier, *Mme. Guyon, sa vie, sa doctrine, son influence* (Paris, 1881); Upham, *Life, Religious Opinions and Experiences of Mme. Guyon* (New York, 1870). For her spiritual life, the best work to consult is *La vie de Mme. J. M. B. de la Motte Guyon écrite par elle-même* (3 vols., Cologne, 1720). This was probably not composed by herself as it now exists, but is a compilation of documents left by her. The most complete translation is *Autobiography of Madame Guyon* (2 vols., Saint Louis, 1897). There is a *Recueil de poésies spirituelles* (5 vols., Amsterdam, 1689). Some of these have been translated by the English poet Cowper.

GUYON, gī′ŏn. Richard Debaufre (1813-56). A general in the Hungarian Army in the Revolution of 1848-49. He was born at Wolcott, near Bath, in England. After fighting against Dom Miguel in Portugal, Guyon entered the Austrian service in 1832, and was among the first to offer his services to the Hungarian Government in 1848. He took part in the battles of Schwechat (October 30, 1848) and Tyrnau (December

14th), and in February, 1849, as a commander of a division in Görgey's army, carried the mountain pass of Branyiszkó. When in April, 1849, the garrison of the besieged fortress of Komorn was to be apprised of the victorious approach of the National Army, Guyon, with a detachment of hussars, cut his way through the enemy's lines and entered the town. He took Arad, July 1st, and shared in the victory of Hegyes, and in the disasters of Szöreg and Temesvár. After the last battle Guyon escaped to Turkey, and entered the service of the Sultan. Under the name of Kurshid Pasha he was Governor of Damascus, and at the beginning of the Crimean War did much to organize the Army of Kars. He died at Constantinople.

GUYON, Sir. The personification of temperance, and the hero of the adventures of the second book, in Spenser's *Faerie Queene.* He overcomes the various specific forms of intemperance, and finally conquers Acrasia, the personification of intemperance in general.

GUYOT, gē'ō', Arnold (1807-84). A Swiss-American geographer and geologist, born near Neuchâtel, Switzerland. He studied at the College of Neuchâtel and the University of Berlin, from 1835 to 1839 was a private tutor in Paris, and from 1839 to 1848 professor of history and physical geography in the College of Neuchâtel. In 1848 he settled at Cambridge, Mass., in the same year gave a series of lectures at the Lowell Institute, Boston, from 1848 to 1854 was in the service of the Massachusetts State Board of Education as a lecturer, and from 1855 until his death was professor of physical geography and geology in Princeton. He also held a lectureship in Princeton Theological Seminary from 1861 to 1866. In 1838 he made one of the earliest scientific investigations regarding glaciers, and in a paper submitted in that year to the Geological Society of France was the first to proclaim and account for the laminated structure of the glacial ice. He perfected a system of meteorological observations for the United States from which the present Weather Bureau was derived; made barometric surveys of the Appalachian Mountain chain, and prepared *Meteorological and Physical Tables* (1852; rev. ed. 1884), a collection that has been very extensively used. He also did much for the study of geography in America through the preparation of series of text-books and wall-maps, for which he obtained a medal of progress at the Vienna Exhibition of 1873. In addition to numerous papers contributed to the *American Journal of Science*, the reports of the American Association for the Advancement of Science and the Smithsonian Institution, and other periodicals, he published *Earth and Man* (1853; the Lowell Lectures, translated by C. C. Felton); *A Treatise on Physical Geography* (1873); *Memoir of Louis Agassiz* (1883); and *Creation, or the Bible Cosmogony in the Light of Modern Science* (1884). Consult the sketch by Dana in the *Biographical Memoirs of the National Academy of Sciences* (vol. ii., pp. 311-47, Washington, 1886), containing the text of an address read before the National Academy, April 21, 1886, with a complete list of Guyot's writings.

GUYOT, Yves (1843—). A French politician and publicist, born at Dinan (Côtes du Nord) and educated at Rennes. After a career as a journalist, and as a member of the Radical Party in the Chamber of Deputies, he was appointed Minister of Public Works in the Tirard Cabinet (1889), and retained this portfolio in the Freycinet Ministry (1890-92). He became known as a champion of commercial and industrial freedom, and an opponent of protectionism and socialism. M. Guyot took a prominent part in the discussion over the Dreyfus affair. His works include: *Etudes sur les doctrines sociales du christianisme* (2d ed. 1881); *La science économique* (2d ed. 1887); and *La tyrannie socialiste* (1893). In association with A. Raffalovitch he published a *Dictionnaire du commerce, de l'industrie et de la banque.*

GUYSBOROUGH, gīz'bûr-ō. A seaport town, capital of Guysborough County, N. S., on Chedabucto Bay, 61 miles east-southeast of Pictou (Map: Nova Scotia, H 4). It has a fine harbor. Fishing is the leading occupation. It was founded in 1783. Population, in 1901, 1411.

GUYSE, gīz, John (1680-1761). An English Presbyterian divine. From 1727 till his death, November 22, 1761, he was a preacher in London. He is remembered for his *Practical Expositor, an Exposition of the New Testament in the Form of a Paraphrase* (London, 1739-52), frequently republished and reprinted, and once very popular, but now hopelessly antiquated.

GUY'S HOSPITAL, Southwark, London. An institution founded by Thomas Guy (q.v.), a London bookseller, who leased from the governors of Saint Thomas's Hospital a large piece of ground for a term of 999 years, at a ground-rent of £30 a year. The building was begun in 1722, and the hospital admitted its first patient in 1725, a few days after the death of its founder, who bequeathed £219,499 to endow it. In 1829 a Mr. Hunt bequeathed to the hospital £190,000, and additional bequests have since been received. The number of beds has been increased from 400 to 700. The yearly average of patients is over 5000; the out-patients relieved may number 50,000. The annual income is about £40,000. A library and valuable museum are attached to the hospital. New wards were built in 1852, and a chemical laboratory in 1872. Additional laboratories were added in 1893. Students enter the hospital for study, attending chemical practice, lectures, etc., and paying annual fees. Fifty students besides the house staff are lodged in the residential building. In the chapel is a fine marble statue of Guy, by Bacon. Sir Astley Cooper, the eminent surgeon, is buried in the chapel. Consult Wilks and Bellamy's *History of Guy's Hospital* (London, 1893).

GUYTON DE MORVEAU, gē'tôn' de môr'vō', Louis Bernard, Baron (1737-1816). A French chemist, born at Dijon. He was for a time deputy attorney-general in the parliament of his native city, but devoted most of his time to the study of the physical sciences, and published a number of interesting original researches. In 1782 he undertook to reform the system of chemical nomenclature. Soon Lavoisier, Berthollet, and others joined him in this important work, and in 1787 they published their *Méthode d'une nomenclature chimique*, which was unanimously adopted by the scientific world. Guyton wrote a "Dictionary of Chemistry" for the *Encyclopédie méthodique.* He was professor of chemistry at the Ecole Polytechnique, and one of the

first members of the Institute. He was a member of the Legislative Assembly and of the Convention, where he voted for the execution of Louis XVI. From 1800 to 1814 he was at the head of the French mint, where he did much to promote the use of the decimal system.

GUZEL-HISSAR, gu′zel-his-sär′. A city in Asiatic Turkey. See AIDIN.

GUZERAT, goo′ze-rät. See GUJARAT.

GUZMAN, gooth-män′, DE. A title often applied to Saint Dominic. See DOMINIC, SAINT.

GUZMAN, NUÑO (or NUÑEZ) BELTRAN (c.1485-1544). A Spanish lawyer and soldier, born at Guadalajara. He was for a time Encomendero at Puerto de Plata, Española, and in 1526 was appointed Governor of Pánuco, a province of Northwestern Mexico. He busily schemed against Cortés, and invaded Narvaez's territory of Rio de las Palmas. In 1528 he became president of the first Audiencia of Mexico, and until 1531, when he was deposed by the second Audiencia, was ruler of the country. He conquered the district long known as Nueva Galicia in 1530, and was appointed its Governor. He had little save his bravery to recommend him.

GUZMÁN BLANCO, blän′kô, ANTONIO (1829-99). A Venezuelan soldier and political leader, born in Caracas. Early in life he was banished for his share in political disturbances, and after taking a prominent part in two invasions, became Vice-President of Venezuela under Falcón, in 1863. Driven from office in 1868, he headed a revolution, which restored him to power in 1870, and for many years he was virtual dictator of the country. Other men were occasionally permitted to fill the office of President, but they were merely figure-heads. In 1889, however, popular discontent was aggravated by reports of corrupt contracts made in Paris; and Guzmán Blanco, who was then acting as envoy to all the European powers, was practically deposed by Congress. Although he amassed great wealth by questionable methods, and his rule was despotic, he introduced many beneficent reforms, improved the public credit, founded schools, and built canals and railways.

GUZMAN DE ALFARACHE, dä äl′fä-rä′-chä. The hero of a Spanish romance by Mateo Aleman, published at Madrid, the first part in 1599, the second in 1605. The story is that of a boy cast upon the world, who in his career passes through almost all the phases of knavery. The style is dry and the adventures are used as texts for a severely sarcastic commentary. It is much more minutely realistic than its contemporary, *Don Quixote*.

GWALIOR, gwä′lê-ôr. A native State or agency of Central India, the dominions of the Maharajah Sindhia, consisting of a main northern portion, which is separated from Rajputana, on the northwest, by the Chambal River, and of several detached portions straggling far to the south (Map: India, C 3). Area, 29,047 square miles. Lying partly in the basin of the Jumna, and partly in the basins of the Nerbudda and the Tapti, it divides its drainage between the Bay of Bengal and the Arabian Sea. The population, including that of the Guna Agency, which was united with Gwalior in 1896, in 1891 was 2,095,000; in 1901, 2,150,000. Though Gwalior is a Mahratta principality, it is only to the south of the Nerbudda that the Mahrattas form any considerable proportion of the people. Since 1803 the country has been under British protection; the existing relations date from 1844. In 1843 the death of the sovereign, by producing universal anarchy, led to the forcible interposition of the British Government. By a treaty of the following January, in addition to a large contingent under British authority, the native Government was permitted to have 9000 troops of its own. Capital, Gwalior (q.v.).

GWALIOR. The capital of the State of the same name in Central India, near the northeast extremity of its straggling territory (Map: India, C 3). Its nucleus is a citadel crowning an isolated rock about 300 feet in height, perpendicular on all sides, and measuring 1½ miles by 300 yards. It can accommodate a garrison of 15,000 men. The spot is supposed to have been occupied as a stronghold for more than a thousand years, and the summit has been provided, from time to time, with several spacious tanks. Along the eastern base of this eminence lies the town of Gwalior, which contains a beautiful mosque of white sandstone, while in the vicinity palaces, rock temples, and statues abound, of particular archæological and architectural interest. To the southwest the Lashkar, or camp of the Maharajah's army, extends for several miles, while to the northeast is the Murar, or cantonment of the protecting contingent. Gwalior has had a long and eventful history, not the least important among its varied incidents being the mutiny of the native army in 1857, notwithstanding the fidelity of the Maharajah. Population, in 1891, 104,100; in 1901, 118,200.

GWIN, WILLIAM MCKENDRY (1805-85). An American politician. He was born in Sumner County, Tenn., graduated in medicine at Transylvania University in 1828, and for five years was a practicing physician at Clinton, Miss. He was a Democratic Congressman from that State in 1841-42, but in 1848 declined a renomination, and in 1849 went with the gold-hunters to California. He was a member of the California Constitutional Convention late in 1849, and was a member of the United States Senate from 1850 to 1861, when he was arrested on a charge of disloyalty, and was imprisoned. On his release in 1863, he went to France, and took part in an unsuccessful scheme for colonizing Sonora, Mexico, with Southerners.

GWIN′NETT, BUTTON (c.1732-77). An American patriot, a signer of the Declaration of Independence. He was born in England, engaged in business in Bristol, and in 1770 removed to Charleston, S. C., where he remained until 1772. In the latter year he purchased a plantation on Saint Catherine's Island, Georgia. Through acquaintance with Dr. Lyman Hall he became intensely interested in the early Revolutionary movement in Georgia, and in 1775 was a member of the first delegation elected by that province to the Continental Congress. He was a member of that body at the time of the adoption of the Declaration of Independence, of which he was one of the signers. In 1776-77, as a member of the Georgia Constitutional Convention, he took a prominent part in framing the new State Constitution, and in the same year was president of the Provincial Council. Defeated both for the office of Governor under the new Constitution, and for selection as brigadier-general of the Georgia

troops, he expressed his resentment openly against Gen. Lachlan McIntosh, who had been successful in securing the latter post. A duel followed in which both principals were wounded, Gwinnett mortally. Consult Dwight, *Lives of the Signers* (new ed., New York, 1895).

GWYNIAD, gwin'ĭ-ăd (Welsh, whiting). A British whitefish (*Coregonus faro*), usually called a herring on account of its form, large scales, and silvery appearance. It is of inferior quality as a food-fish. See WHITEFISH.

GWYNN, GWIN, or **GWYN,** ELEANOR (1650-87). An English actress, mistress of Charles II. The place of her birth is not definitely known. She was brought up in poverty, and as a child sold oranges at the Theatre Royal in London. In 1665 she made her first public appearance as Cydaria in Dryden's *Indian Emperor*, and from that time until 1682 (when she left the stage) was a great favorite in parts which required little emotional fervor. She was in no respect a great actress, and her sprightliness, beauty, and skill in dancing seem to have been the chief causes of her popularity. She had many lovers, among them Charles Hart, the actor, and Charles Sackville, who in 1677 became sixth Earl of Dorset. About 1669 she became the mistress of the King, by whom she had two sons, Charles (1670), called Beauclerk, who was subsequently made Duke of Saint Albans, and James (1671), who died young. She retained her popularity throughout life. As the King's mistress, she was received into the best of London society, and she was in favor with the people for her many acts of charity. She was illiterate, even for those times, but her animation, humor, and good nature seem to have more than overbalanced her defects. According to Burnet and Evelyn, the dying request of Charles II. was, "Let not poor Nelly starve." After the King's death she led a quiet life. She died in London, and was buried in the Church of Saint Martin's-in-the-Fields. According to her request, Dr. Tenison, afterwards Archbishop of Canterbury, preached her funeral sermon. Consult: Seymour, *Memoirs of the Life of Eleanor Gwinn* (London, 1752); Cunningham, *The Story of Nell Gwyn* (London, 1850).

GYA, gī'ä. A town in Bengal, British India. See GAYA.

GYAROS, jī'ä-rōs. One of the Cyclades (q.v.), known at present as Giura, and situated 10 miles northwest of Syros. Area, about 12 square miles. It is mountainous and uninhabited, and was once used by Rome as a place of banishment.

GYAS, jī'as. (1) A companion of Æneas, and commander of one of his ships. (2) A Latin in the army of Turnus, slain by Æneas.

GYBE. See JIBE.

GYGES, gī'jēz (Lat., from Gk. Γύγης). King of Lydia from B.C. 689 to 654, and the founder of the powerful dynasty of the Mermnadæ. According to Herodotus, Gyges was the favorite of King Candaules of the ancient line of the Heraclides, and commander of the household troops. Candaules, proud of his beautiful queen, Nyssia concealed Gyges in the royal bedchamber one night to prove the truth of the extravagant praises he had bestowed on her beauty. The Queen became aware of the presence of Gyges, but pretended ignorance, and summoning him on the morrow, offered him the choice between her hand, together with the throne of Candaules, and death. Gyges slew the King and seized the crown. The Lydians resisted his usurpation until the oracle at Delphi, bribed by gifts of immense value, declared in his favor. He waged successful wars against the cities of the coast, and extended the boundaries of the Empire. Plato has a fable in which Gyges is represented as a shepherd of Candaules, who had discovered a magic ring by which he was enabled to make himself invisible, by which means he murdered the King and secured the sovereignty. According to a third tradition, Gyges overthrew Candaules with the aid of foreign mercenaries. The 'riches of Gyges' and the 'ring of Gyges' were popular proverbs in ancient and mediæval times.

GYLDÉN, yul'dān, JOHAN AUGUST HUGO (1841-96). A Swedish astronomer, born and educated at Helsingfors, Finland. Having been an assistant to Struve in the Observatory at Pulkova, he was appointed director of the Royal Observatory at Stockholm, Sweden, in 1871. In 1884 he was appointed director of the observatory at the University of Goettingen. He published *Untersuchungen über die Konstitution der Atmosphäre* (1867-70); *Studien auf dem Gebiete der Störungstheorie* (1871); *Die Grundlehren der Astronomie nach ihrer geschichtlichen Entwicklung dargestellt* (1877); *Versuch einer mathematischen Theorie zur Erklärung des Lichtwechsels der veränderlichen Sterne* (1880); *Die intermediäre Bahn des Mondes* (1883); *Untersuchungen über die Konvergenz der Reihen welche zur Darstellung der Koordinaten der Planeten angewendet werden* (1887); *Nouvelles recherches sur les series employées dans les theories des planètes* (1893); and *Traité des orbites absolues des huit planetes principales* (1894).

GYLIPPUS, jī-lĭp'pŭs (Lat., from Gk. Γύλιππος). A Spartan general in the Peloponnesian war, son of Cleandridas, the councilor and fellow exile of the young King Pleistoanax. He was appointed the commander of the expedition sent to aid the Syracusans against the Athenians, B.C. 414. Though his ships were so few that Nicias at first thought they belonged to an insignificant privateering expedition, Gylippus, with the reënforcements drawn from various Sicilian towns, and by his skillful operations, completely defeated the Athenians, and captured their commanders, Nicias and Demosthenes, in B.C. 413. After the capitulation of Athens to Lysander, Gylippus was commissioned by the latter to take home the treasure, but stole a considerable portion, and was condemned to death for the crime. He escaped, however, and died in exile. Consult Plutarch, *Nicias*, 28; Diodorus Siculus, xiii., 106; and Thucydides, vii.

GYLLEMBOURG-EHRENSVÄRD, yul'lem-bōōr-y'ā'rĕn-svârd, THOMASINE CHRISTINE, Baroness (1773-1856). A Danish novelist, born at Copenhagen. Born Buntzen, she married at seventeen Peter Andreas Heiberg, and had one son, Johan Ludvig Heiberg (q.v.). Her husband was banished for political activity (1799), and she obtained a divorce and married a Swedish political refugee, Baron Ehrensvärd, who assumed in Copenhagen his mother's name, Gyllembourg, and who died in 1815. After this she lived with her son, the poet Heiberg, and at fifty-

three began a busy literary career with *The Polonius Family* (1825). Afterwards she wrote steadily though anonymously till her death. Among her better novels are *Near and Far* (1841) and *Two Generations* (1845).

GYLLENBORG, yul′len-bôr-y', KARL, Count (1679-1746). A Swedish statesman and author. He was born at Stockholm, and after serving in the Polish War was sent to London as secretary of legation. In 1715 he was made Minister Plenipotentiary, and two years later was imprisoned for five months because of his participation in the plot to reinstate the House of Stuart. In 1723 he was appointed Councilor of State, and in 1738 Prime Minister. While in this office he founded the *Hattparti* or *Hattar* ('Hat' Party), which instigated the disastrous war with Russia (1741-43), resulting in the loss of the Province of Viborg. He was successively chancellor of the universities of Lund (1728) and Upsala (1739), was a patron of letters and art, and wrote several poems and the first Swedish comedy, *Den svenska Spratthöken* (1740). His *Letters . . . Relating to a Design to Raise a Rebellion on His Majesty's Dominions, to be Supported by a Force from Sweden*, were published in French and English (1717).

GYMKHANA, gĭm-kä′nȧ (probably a corruption of Pers. *gand-khanah*, ball-house, influenced by popular association with *gym-nasium;* also explained as being from Eng. *game* + Pers. *khanah*, house). A generic term, originating in India, and signifying an outdoor meeting for recreational purposes. Ordinarily, gymkhanas are of two kinds: one, a race meeting on a small scale, in which any sort of horse takes part in order to make up a 'card,' and in which the races are generally for catch-weights. The second type of gymkhana is a variety of what was formerly called the 'pāgāl' ('foolish' or 'amusing') gymkhana, in which, besides the usual horse and pony races, other competitions for men and women, mounted and dismounted, are introduced; also tent-pegging and tilting, the former for men, and the latter for women. Every cantonment in India, no matter how remote, or how large or small, has its periodical gymkhana. The 'card' or programme is arranged so as to include all classes of cantonment society, and consists of flat and obstacle racing, jumping, blindfold races, egg and spoon races, sack races, etc., for the rank and file of the local garrison. Among the events set apart for the natives none is more important than the race with an earthenware chatti full of water, carried on the head, or the wheelbarrow races. For the officers, military and civil, are such events as 'tent-pegging' and 'tilting' in couples, in which the man rides at the peg and the woman tilts at a ring; 'threading-the-needle' race; 'Aunt Sally' race, performed by two men and two women, riding from the starting-point to a fixed place, where the men dismount their partners and hold their horses, while the women throw stones at four empty bottles. The moment the bottles are broken the women are remounted and the partners race back to the post. A favorite competition is the 'wand' or 'maize' event, in which mounted competitors canter in and out between rows of posts or wands driven into the ground, and placed at convenient distances apart from one another in two parallel lines. The competitors must 'make the ride' without touching a post. A menagerie race usually winds up the meeting, and, owing to the many varieties of animals common to the country, an extremely varied assortment of competitors is always possible. In the hill stations the concluding feature is generally a 'jinrickshaw' (colloquially 'rickshaw) race, in which these light conveyances, drawn by coolies and driven by Europeans, race with each other. A 'rickshaw may be described as an enlarged perambulator mounted on two wheels and fitted with a shaft. It is drawn by two natives in the shaft, while two push behind. Although the gymkhana has become popular in England within recent years, and has also been introduced into America, it has not the same reason for existence, or value as a sport. In India, owing to the nature of the climate, and the few hours of comparative coolness, together with the impossibility of following the ordinary sports of the West, considerable ingenuity has to be exercised to invent games which shall afford harmless amusement, and at the same time be within the scope of the usually limited resources of the average cantonment.

GYMNASIA (gĭm-nä′zĭ-ȧ) **AND REAL-GYMNASIA,** rȧ-äl′gĭm-nä′zĭ-ȧ (Lat. nom. pl., from Gk. γυμνάσιον, *gymnasion*, from γυμνάζειν, *gymnazein*, to train, from γυμνός, *gymnos*, naked). The classical higher or secondary schools of Germany, graduation from which, until recently, necessarily preceded the university course and all professional careers. The Gymnasia arose in Germany out of the humanistic movement during the sixteenth century. The existing schools were monastic and cathedral under the control of the Church, and guild schools controlled by the guilds or municipalities, but yet taught and dominated by the clergy. Such schools were devoted almost exclusively to the study of Latin, organized into the traditional curriculum, consisting of the trivium (q.v.) grammar, rhetoric, and dialectic, and the quadrivium (q.v.) arithmetic, astronomy, geometry, and music. The study of the quadrivium was of a most superficial character, while that of the trivium was formal, with no appreciation of the spirit of the Latin literature and no devotion to classical ideas. The humanistic movement reached the German States during the last quarter of the fifteenth century, and soon modified not only the culture of the universities, but also the work of the secondary schools. Probably the first schools to respond to the new influences were those of Nuremberg, which were modified in 1485 and again in 1496. It was not till 1521, however, that this movement was complete, and instruction in Greek and Hebrew added, thus constituting a true humanistic school. Meanwhile the Protestant Reformation had begun, and for the time being coincided in its educational aspects with the earlier Renaissance movement. In addition to instruction in classical Latin and Greek, the Reformation influence favored the consolidation of existing schools into stronger centralized ones, or even into complete systems extending over an entire State, and also the placing of these under secular control.

The first Protestant school of the humanistic type was that of Magdeburg, established in 1524. About the same time Melanchthon formulated his 'school plan' providing for both Greek and Hebrew, at least for the favored few, and this plan became the basis of most of the Protestant schools of Germany. The first general system of schools

which provided for the Gymnasia was that of Saxony, formulated in 1528, but without providing for Greek in such schools until a later date. The Gymnasium most influential as a type was that of Strassburg, founded (or modified) in 1538, under the headship of Johannes Sturm (q.v.). Only of slightly less importance were the Gymnasium of Goldberg under Trotzendorf and that of Ilfeld under Neander. The Protestant movement for the establishment of Gymnasia may be said to have culminated in 1580 with the establishment of the revised school plan of Saxony. From 1540 on, the Jesuit Order established numerous schools that were similar to the Gymnasia in all respects save in their religious instead of secular control. The rivalry between these types of schools, together with the change in the character of the Reformation movement, which eliminated the earlier sympathy shown with humanism, was responsible for the decline in the character of the Gymnasia. Instruction became most formal, little interest was shown in the content of ancient literature, scholasticism was rehabilitated, and the sympathies of the masses were alienated. Such remained the condition throughout the seventeenth century. During the last decade of that century and the earlier part of the eighteenth, the Pietistic movement put new life into education. This change in spirit and motive of education, and the substitution of a more vital interest in the study of classics in place of the existing formalism, culminated in the formation of a new type of school—the *Realschule* (q.v.), for those who were not destined for the learned professions. The Prussian monarchy exerted throughout the eighteenth century, especially under Frederick the Great, a quickening influence on education. But it was not till the latter part of that century, under the leadership of such men as Herder, Kant, Lessing, Goethe, and Schiller, that there was infused the new humanistic spirit that has characterized the German Gymnasia from that day to this. During the past century, particularly, the needs of an age devoted more to the material than to the ideal, as well as the rapid rise to importance of mathematical and natural science, could not fail of influence or be left without due provision. Yet even now the chief subject of gymnasial teaching is the pursuit of the humanities—i.e. the study of classical antiquity, the two languages of which, Latin and Greek, form the foundation of the teaching and study of the Gymnasia. Still, while retaining this foundation, the strongest efforts are no longer directed, as in former times, toward the most exact familiarity possible with the languages *per se*, but the introduction of the students into the spirit of antiquity is made of prime importance; and hence the ancient writers are treated not so much with reference to their grammar and style as to their general human, moral, and æsthetic significance. In the lower classes, naturally, a certain formal strictness is indispensable for strengthening the linguistic foundation, for sharpening the perception, and developing a clear, logical method of thought, for which nothing else is so well adapted, according to the German view, as the structure of Latin grammar.

The character of the Gymnasium is best seen through a statement of the entire system of higher schools in Prussia. The Gymnasia include a nine-year course, with both Greek and Latin; the Progymnasia are similar schools of six or seven-year courses; the Realgymnasia give a nine-year course, with Latin, but no Greek; the Realprogymnasia, similar courses of six or seven years' length; the Oberrealschulen offer a nine-year course, with neither Latin nor Greek; the Realschulen or burgher schools (Bürgerschulen) are similar schools, with six-year courses only. The burgher school in many of the German States is simply a common school with a continuation school (Fortbildungsschule) course attached. The organization and curriculum of the Gymnasium in the various States of Germany present many points of difference, but in essential characteristics there is unity throughout, so that students can be transferred from one to another without interruption of their work. The Gymnasium embraces nine classes or one-year courses: Sexta, Quinta, Quarta, lower and upper Tertia, lower and upper Secunda, lower and upper Prima. Pupils are admitted to Sexta at nine or ten years of age, and are required to have a knowledge of reading, writing, and arithmetic. Latin is the basis of instruction from the beginning. In the Prussian schools eight hours a week is given to it for the first two years, seven for the next four, and six for the last three. The emphasis on Latin is much greater in the other States than in Prussia, where the entire course calls for sixty-two week hours in this subject, while in Württemberg it is eighty-one. The official programme of 1901 expresses the aim of Latin instruction thus: "On the sure basis of grammatical training to enable boys to understand the more important writers of Rome, and thus to introduce them to the intellectual life and culture of the ancient world." In the Realgymnasium the purpose is stated to be the comprehension, based on accurate grammatical knowledge, of the easier works of Roman literature. Latin essays are no longer required. Reading begins in the Quarta with Cornelius Nepos and Phædrus; in the Tertia, Cæsar and Ovid; in the Secunda, Cicero, Livy, Sallust, and Vergil; in the Prima, Cicero, Tacitus, and Horace; sometimes extracts from Catullus, Tibullus, and Propertius, and, exceptionally, Terence or Plautus. Greek in the fourth year (Lower Tertia) occupies six hours a week in each class. The grammar is finished in the fourth year; the authors read are the following: First, Xenophon; then, in the Secunda, Homer's *Odyssey*, Xenophon, Herodotus, and Lysias; in the Prima, Homer's *Iliad*, Demosthenes, Thucydides, and Plato, extracts from the lyric poets; of the tragic poets, Sophocles and Euripides, rarely Æschylus. Besides the authors named various others are not excluded, as Isocrates, Plutarch, Arrian, Curtius, Quintilian.

A change, revolutionary in character, which to a great degree breaks down the distinction between the Gymnasia and the Realgymnasia, was introduced in 1901 and 1902, as a result of the conflict begun some ten years previously, under the leadership of the present Emperor, and waged for the modernization of the higher curriculum. This change is the introduction of English into the gymnasial course and making Greek elective. This is the most far-reaching change made since the introduction of the Realschulen. In 1901 the higher professions, save that of the ministry, were opened to those who had no knowledge of the Greek language, but who possessed in its stead a corresponding knowledge of modern languages. A strong tendency away from the Greek imme-

diately made itself felt. The school which gave the necessary languages, Latin, French, English, was the Realgymnasium. But there were in Prussia (in 1898) 277 Gymnasia and only 67 Realgymnasia, and hence such a shifting of clientage would have been injurious to both schools. Moreover, the character and amount of the instruction in Latin in the Realgymnasia is inferior to that of the Gymnasia. Hence some modification of the gymnasial curriculum was necessary. Then followed the introduction of English and the placing of Greek on an elective basis.

The great difference existing between the Gymnasia and the Realgymnasia is still that of the respective emphasis on the classics. A much greater time is given to the study of Latin in the Gymnasia and to science in the Realgymnasia. Both French and mathematics receive greater attention in the Realgymnasia. In the Gymnasia French begins in the third year (Quarta) with four hours a week; later, three; then only two. Little time can be spared for practice in speaking; grammar and reading form the chief parts of the instruction. The reading embraces the classical and the most important of other poets and prose writers. German is given four to three hours with the following course: In the lower classes, mythology, grammar, and explanation of poetical works; in the middle classes, rhetoric, poetics, and the reading of easy plays and larger poems; in the Prima, the history of German literature, reading of the *Nibelungenlied* and Walther von der Vogelweide, with the most important works of the classical period, especially Lessing, Schiller, and Goethe, and some introduction of Shakespeare. Hebrew and English are elective and are given two hours a week. The recent change has given much more time to English. Mathematics has four hours throughout, except in Tertia, where it has only three, and includes geometry, mensuration, plane and spherical trigonometry, stereometry, and the elements of analytical geometry; in arithmetic, the fundamental operations, equations of the first and second degree, arithmetical and geometrical computations, compound interest and stocks, combinations, the theory of probability, and the binomial theorem. The natural sciences have throughout two hours, and embrace descriptive natural history, zoölogy and anthropology, botany and mineralogy, physics, mathematical geography, and an introduction to astronomy and chemistry. History receives two hours in the lower middle classes, and three in the upper. The matter is so divided that the whole passes twice before the pupil; in the Quarta, ancient history; in the Tertia, mediæval and modern; in the Secunda, the history of Greece and Rome for the second time; and in the Prima, general history, from the migrations of the nations to the present time, with special reference to German history. Geography has two hours in each of the lower classes, one in the Tertia, with a review of the subject in the upper classes in connection with history. The Sexta has two hours of penmanship. Religion (separately, according to creed) has four hours. Gymnastics, singing, and drawing have each two hours; the last branch is not pursued in the four upper classes.

The number of hours of teaching averages 30 to 34 per week. The instruction is given from 8 to 12 A.M. (intermission at 10 o'clock), and from 2 to 4 or 5 P.M.; the afternoons of Wednesday and Saturday are free. For home preparation one to two hours are required from the lower classes, two to three hours from the upper. Vacations occur at Christmas, Easter, sometimes at Whitsuntide, and the longest in the autumn, altogether eleven weeks. At the end of the school year (generally at Easter) formal public closing exercises are held, with the announcement of promotions and distribution of prizes to the best scholars. A pupil who has in no report the note 'unsatisfactory' is transferred to the next higher class. If two branches are unsatisfactory he is required to pass through the same class again, in Prussia even with one 'unsatisfactory.' In Southern Germany in such a case a reëxamination in the study after vacation determines his remaining or advancement.

As the Gymnasia are only very seldom boarding schools (*Internata*), the maintenance of discipline outside of school is accomplished by certain regulations, which, however, allow scholars of the Prima somewhat greater freedom. The punishment for transgressions is arrest, imprisonment, or the *consilium abeundi*, which is followed at the next offense by expulsion. Each class is in general limited to forty students, and when that number is exceeded parallel divisions are formed. Since many Gymnasia have 700-800 pupils, all their classes contain two, sometimes even three, divisions. Each class is under the special supervision of a class teacher or 'ordinarius,' who teaches the chief branches in that class. At the head of the Gymnasium is a 'director.' The directors are themselves responsible to an 'Oberschulrat' or 'Oberstudienrat' (Board of Education), in Prussia the 'Provinzialschulkollegium,' and the latter to the Ministry of Religion and Instruction. Conferences of the directors and higher school officials act on questions of instruction, and determine changes in method, conditional upon the Imperial sanction.

The higher schools are primarily State institutions; some are also municipal. The State supervises the schools by inspections, appoints and pays the teachers, who bear in the south the title of 'professor,' in the north that of 'Oberlehrer'; but specially deserving teachers in Prussia also receive the title of professor. Younger teachers, from their State examinations to their definite appointment, bear the title of 'Lehramtspraktikant' or 'Probecandidat' (probationary instructor). Teachers without academic education are employed only for arithmetic, natural history, penmanship, and the special branches, drawing and gymnastics. The instruction is not free; the State receives a tuition fee of 60-120 marks, according to the class. At the completion of the gymnasial course the examination for graduation (Arbiturienten- or Maturitätsprüfung) is held under the direction of a State commissioner and is judged very severely. The successful candidates receive the certificate of fitness for the university. The privilege of granting this certificate belonged formerly to the Gymnasium alone, but graduates of the Realgymnasium may now enter law, medicine, and all studies of the philosophical faculty, save classical languages. The certificates of the Oberrealschule admit to university study of mathematics and natural sciences. The other higher schools fit for the great technical schools. A privilege quite as highly prized as that of fitness for the university,

and one that is to a great degree responsible for the large attendance and public support of the Gymnasia, is the exemption from one year of the required two years' military service on successful completion of the six-year gymnasial course. Nearly one-half of all secondary pupils in Prussia leave school at the end of six years after securing this privilege. This privilege also explains the formation of the Progymnasium, which offers simply the first six years of the gymnasial course. The Realgymnasium differs from the Gymnasium in the stronger emphasis on the non-classical subjects, as is seen in the greater number of hours given to mathematics and the sciences, and the fewer hours given to Latin, in the omission of Greek, and in the requirement of English as well as French. The Realschulen (q.v.) and the Oberrealschulen are altogether non-classical. Every higher school has a well-endowed school library and a teachers' library, and publishes at the end of each school year a 'Program,' which is, first, a handbook of school information records, vacations, and lists of students, and, second, contains a scientific treatise written by a teacher of the school.

In essential unity of method and in the equal supervision of the State, the higher schools as a whole stand on the same plane of excellence, although one or another institution may occasionally enjoy a position of preëminence through the influence of a specially gifted director, or a happily constituted faculty. So in Prussia the 'Landes- und Fürstenschule' Pforta (Foundation school), in Saxony the 'Landes- und Fürstenschule' at Meissen, all founded previous to the middle of the sixteenth century, in Württemberg the 'élite' schools of the upper Gymnasia (without lower classes), in which only pupils of marked excellence are received—e.g. at Maulbronn. Some of these most noted institutions are boarding-schools. At the present time there are in all Germany more than 1200 approved higher schools, of which about 450 are Gymnasia. Consult: Matthew Arnold, *Higher Schools and Universities in Germany* (2d ed., London, 1882); Schrader, *Erziehungs- und Unterrichtslehre für Gymnasien und Realschulen* (5th ed., Berlin, 1893); Paulsen, *Geschichte des gelehrten Unterrichts auf den deutschen Schulen und Universitäten* (2d ed., Leipzig, 1895-97); Russell, *German Higher Schools* (New York, 1899); Bolton, *Secondary School System of Germany* (New York, 1900); *Special Reports on Educational Subjects by the Board of Education of Great Britain*, vols. i., iii., and ix. See NATIONAL EDUCATION, SYSTEMS OF; REALSCHULEN.

GYMNA'SIARCH (Lat. *gymnasiarchus*, from Gk. γυμνασίαρχος, *gimnasiarchos*, from γυμνάσιον, *gymnasion*, gymnasium + ἀρχός, *archos*, leader, from ἄρχειν, *archein*, to lead). The name of a Greek official, whose rank and duties varied widely in different places and at different times. In Athens during the fifth and fourth centuries B.C. a gymnasiarch was chosen annually from each tribe to bear the expenses of the torch races. (See LAMPADEPHORIA.) The duties included the payment of all expenses connected with the training of the competitors, and the office was one of the most expensive of the public services demanded by Athens of her wealthy citizens. The name seems to imply that the gymnasiarch had also certain rights and duties in the gymnasia during the training of the youths, but there is no definite information on this subject. After the establishment of the Macedonian power we find a change at Athens. There is now one gymnasiarch chosen annually, and his office is one of great dignity. He has the general oversight of order and discipline in the gymnasium of the ephebi (q.v.), and sometimes undertakes heavy expenses from his own purse. The same name is given to rich ephebi, who undertake for a longer or shorter period, generally one month, to bear certain heavy charges for their comrades, such as the expenses of festivals, or of furnishing the oil needed in the gymnasium. Outside of Athens and the States which copied her gymnastic system, the term denotes either magistrates who have charge of the gymnastic and literary instruction, or those who have to provide for certain expenses connected with the gymnasium or festivals, either from their own property or from the public funds. The wide diversity in details cannot be discussed here. Consult Glatz, "Gymnasiarchia," in Daremberg et Saglio, *Dictionnaire des antiquités* (Paris, 1896).

GYMNASTICS (Lat. *gymnasticus*, from Gk. γυμναστικός, *gymnastikos*, relating to athletic exercises, from γυμνάζειν, *gymnazein*, to train). Indoor exercises for the development of physique by the aid of suitable appliances. A room or building set apart for such purposes, and furnished with the requisite appliances and paraphernalia, is termed a gymnasium. In the training and development of the athlete, indoor exercises occupy a position of paramount importance; indeed, supremacy in field sports, or outdoor games, is rarely possible unless the progressively systematic exercises of the gymnasium are made a part of the training. The preëminence which classical antiquity gave to systematic training, and which resulted in the physically magnificent specimens of humanity common to the Greek games and Roman gladiatorial combats, became lost to the world with the decay of those nations. Gymnastics as practiced to-day may be said to date from the middle of the nineteenth century, and to be a product or result of modern life and conditions. The increasing number of densely populated cities, the stress of industrial conditions requiring a correspondingly complex and exacting mental or technical preparatory education, as well as a lifetime spent under conditions frequently injurious to good physical health or development, have all contributed to render the practice of gymnastics an absolute necessity to the individual, and a subject of serious importance to the nation at large.

At the beginning of the twentieth century it is an important feature of the educational system of every nation in the world, receiving its original impetus in Europe, but reaching its highest development thus far in America. Gymnastic exercises may be divided into three general classes: (1) *Free gymnastics*, under which is included every exercise that is performed without apparatus; (2) *Calisthenics*, under which are included exercises with dumb-bells, Indian clubs, wands, etc.; and (3) *Gymnastics* proper, by which is meant every exercise in which the body is the resistance moved, and in the execution of which a fixed apparatus is necessary. Indiscriminate gymnastic exercises are rarely beneficial, and frequently injurious, if indulged in by any one

who is not qualified by physical capacity, or who has not the knowledge or experience necessary for profitable practice. A physical examination is always a wise preliminary to a course of work in the gymnasium, and where possible a system of exercise should be outlined which will be within the physical capacity of the student, and at the same time beneficial to his physical condition and general health. A physical director or instructor in gymnastics is now a regular officer in every well-equipped modern gymnasium; and his presence is the more indispensable when the fact is borne in mind that while some particular muscle or group of muscles may be developed by one form of exercise, another exercise may result in stiffened joints. In a well-arranged system the exercises are such as will gradually develop the athlete from a condition of weakness to one of long endurance, producing powerful muscles and general suppleness of body. Gymnastic exercises, moreover, play an equally important part in the general health of the body by helping the system to throw off its waste material, improving the circulation of the blood, and promoting growth by feeding new material to all parts of the body, thus supplying the entire system with exactly what its needs demand.

In order to make the gymnasium a popular institution, and supply a needful variation in its work, the different exercises are usually arranged with a view to making them as entertaining and amusing as possible, the monotonous drills of dumb-bells, Indian clubs, etc., being performed to music. An important principle is that gymnastic exercises, if they are to be of permanent benefit, shall be practiced every day; but where this is not possible, some of the exercises of free gymnastics will be found particularly profitable. After each period of exercise a short rest should be taken, or if the heart gives signs of being distressed, the gymnast should gradually reduce the severity of his drill by milder exercises, rather than cease work suddenly. Heavy gymnastic exercises should never begin nor stop suddenly, and in any case should not be continued beyond the first slight sense of fatigue. Authorities are all agreed that the best time for exercise is as follows: For school-children, during the intermission between studies; for adults, the morning hours from 10 to 12 when possible; and for those whose occupations will not permit any daytime exercise, the hours from 8 to 10 o'clock in the evening are considered more helpful than any hour before 7 in the morning. Care should be taken, however, that when exercising at night a sufficient period should elapse before going to bed, in order that the excitement incident to the exercise may have subsided. Gymnastic exercises should never be attempted immediately before or after meals.

Suitable clothing for the gymnasium for men consists of a pair of loose-fitting trousers, a light sleeveless undershirt, and a pair of canvas shoes, without heels. Care must be taken, if a waist-belt is worn, that it is not so tight-fitting as to prevent the free play of the body, and particularly that of the abdominal muscles. The dress for women should be sufficiently loose to afford every possible freedom of action, but where exercises with apparatus are performed, the divided skirt will be found to be preferable.

The most effective exercises in free gymnastics are those used in the physical training of the soldier, which are so arranged as to exercise every muscle and joint of the body, develop the chest, strengthen the lungs, and conduce to an erect and easy carriage. They may be easily arranged and adapted for either sex or any age. Calisthenic exercises with dumb-bells (q.v.), the weight of which may vary from a few ounces upward, although heavy ones are used only for trials of strength and are opposed to effective work in developing muscle, are very effective when performed in class work with musical accompaniment. They are, however, of exceptional value for home or private exercise, and should be used regularly. The ordinary dumb-bell should never weigh over six pounds. There are many exercises arranged for them, in addition to which nearly every physical exercise in free gymnastics can be used with them to very great advantage. Exercises with the wand are also very beneficial and very interesting, but are almost entirely confined to school-children. The wand may be an ordinary broom-handle or cane, but is usually a specially manufactured smooth stick, about four feet long, nearly an inch in diameter, and perfectly straight. During the many exercises, nearly all of which may be easily improvised, it is held in both hands, the palms downward. *Indian clubs* are made of wood and shaped like a wine-bottle. Originally they were weighted with lead, but this practice has long been discontinued, and exercises to develop speed and quickness of movement have taken the place of those originally designed as an exhibition of strength, supple joints taking precedence of enlarged muscles and biceps. The number of movements and exercises which may be performed with the clubs is practically unlimited, and almost any beginner can, if necessary, invent an exercise for himself. Nearly every movement must of necessity consist of combinations of three distinct motions or circles—the straight-arm circle, the bent-arm circle, and the wrist circle. In the first of these movements the club is swung at arm's length, while in the second the movement is made with the arm bent at the elbow, and in the third the hand is the centre of the circle through which the club is moved. These latter circles are made by the muscles of the forearm and hand. Care should be taken that every circular movement should be as near a plain circle as possible. A good club-swinger is able to stand close to a wall without hitting it with the clubs while he is swinging. 'Inside circles' are those in which the club moves first in the direction of the swinger's head; 'outside circles' are movements in the opposite direction.

Heavy Gymnastics, or Gymnastics with Apparatus. Before discussing the appliances familiar to every gymnasium, mention must be made of the many forms of wall apparatus which play so important a part in the gymnasium of today. They are designed for chest development, weight-lifting, wrist and finger strengthening, foot and ankle development, and for the reducing of superfluous weight. Some are in the form of a quarter-circle, others are known as intercostal machines, others as rowing-machines (the seat of which, together with the positions of the feet, is on the rowing principle, the resisting weights being suspended from the wall). Another machine is the traveling parallel. The wrestling-machine is also a friction appliance, the tension

of which, like all other wall machines, is capable of regulation to any desired degree. *Pulley-weights*, or, as they are frequently called, chest weights, are made double for the special purpose of exercising both sides of the body at the same time. It is probably the most important single piece of apparatus for general physical exercise that can be used. The weights are adjustable so that there need be no danger of straining. A good exercise with this apparatus is as follows: Take a handle in each hand and stand facing the apparatus at such a distance as will leave the hands about twelve inches from the pulley when the arms are extended, then, raising the arms to a perpendicular position, return to the original position and repeat the process as many times as desired. Other exercises are as follows: (1) Extend the arms as far apart as possible and return them to the first position. (2) Lower the arms to the sides and return to the first position. These exercises may be combined in any way that the gymnast feels would best advance his scheme of practice. Good exercises for the legs may be obtained by putting a foot in each handle, stirrup fashion, and marking time with the feet or using one foot at a time, balancing with the other leg. In this latter exercise, many movements may be executed, and valuable exercise for the legs and hips thus derived.

A good machine for strengthening the muscles of the neck is one in which a pulley weight is used, having a small semicircular net at the end of the rope. This is placed on the back of the head, which is moved backward and forward, lifting the weight. In this particular exercise the muscles in the back of the neck derive special benefit, but the position may be easily shifted so that the other neck muscles may be similarly exercised.

Dynamometers, or strength-measurers, are machines for testing the muscles; a spirometer, or breath-measurer, is a similar contrivance for gauging the capacity of the lungs. These and similar machines are common in every thoroughly equipped gymnasium, and by their aid the gymnast is enabled to keep an accurate record of his progress and development.

The heavy apparatus usually consists of a horizontal bar; a pair of parallel bars; a trapeze; a pair of hanging rings suspended from the ceiling or bar; a horse or vaulting bar; horizontal, perpendicular, and inclined ladders; and a climbing pole, or rope. The horizontal bar is usually made of hickory, or some other hard wood, and is about six feet long by one and three-quarter inches in diameter. It is sometimes so arranged that it can be adjusted to any height by sliding it up or down the upright posts to which it is fastened. The bar should be placed at such a height that the feet will be clear of the ground, and while some instructors maintain that it is best to hold on to the bar with the thumb on the opposite side from the fingers, it is generally found to be more advantageous to grasp it with the thumb and fingers on the same side. The first exercise with the horizontal bar should be that of drawing the body steadily up until the chin is above the bar, and then lowering it slowly until it hangs again at full length. This exercise should be frequently practiced until the beginner can succeed in raising himself several times in succession without any undue effort. This accomplished, he may practice hanging from the bar, using each hand alternately, or 'walk' along the bar hand over hand, or practice swinging the body backward and forward until he can attain almost a horizontal position. Having thus become familiar with the 'feel' of the bar, he may next proceed to its exercises. To mount, the body must be raised until the chin is above the bar, after which the left leg is raised and thrown over the bar, knee bent. The other leg is now swung until it gains sufficient impetus to aid the gymnast in securing an upright position above the bar, which passes between his legs, after which he may throw the right leg also over the bar, and practice balancing himself on it by sitting in various positions without holding on by his hands. After this, numerous exercises will suggest themselves. A much more difficult apparatus is the hanging or trapeze bar, which is similar to a horizontal bar except that it is supported by two ropes, swing fashion. The same exercises may be performed on it, but with very much more difficulty.

Parallel bars are two bars side by side supported on posts. They are usually from 4½ to 5 feet high, 3 or more inches in diameter, and from 16 to 20 inches apart. They are sometimes oval and sometimes round. An elementary exercise is to practice supporting the weight of the body with a hand on each bar, arms held rigid; after which should be practiced 'walking' along the bars, taking a step alternately with each hand. Care should be taken that the body is perfectly erect, head well up, eyes to the front, legs rigid and close together, and toes pointing to the ground. Another exercise is to allow the body to drop a little by bending the elbows, and allowing them to point backward on a level with the shoulders, the gymnast advancing along the bars by a series of jumps, both hands striking the bars at once. In this exercise considerable reënforcement is obtained by drawing the feet up in readiness to aid the arms at the instant of jumping, and then kicking them straight down. There are a great variety of exercises possible with the parallel bars, which are at the same time among the most profitable of the entire gymnastic curriculum. The vaulting horse may consist of a block of wood, rounded at the top and shaped so as to resemble a horse's back. Two pommels, so constructed that they can be removed when necessary, are fixed on the back, saddlewise. The numerous exercises with the horse range from vaulting it by placing the hands on the pommels, to jumping over it, starting with a run. Hanging rings, or traveling rings, are leather-covered iron rings suspended from above by a rope. Ordinarily, several are suspended in a row so that, commencing with the first one, the gymnast may swing himself to the second, after which he lets go of the first, and so on down the line. There are many positions in swinging, each one of which has its own advantages, while with two of these rings many of the exercises on the horizontal and parallel bars may also be features of gymnastic training. In climbing, the rope is grasped with both hands, one above the other, the rope hanging between the feet, which are crossed. As the hands pull the body up, the rope is allowed to swing between the feet, which proceed to grasp it tightly, permitting the hands one at a time to be moved to a new grip; so that the body is first supported by both hands,

followed by the left hand and the feet, and finally by the right hand and the feet. In descending, the feet act as a brake to regulate the speed of the descent, the hands being lowered one past the other. Pole-climbing is more difficult than rope-climbing, owing to the thickness and rigidity of the pole. Horizontal or inclined ladders are used for ascending and descending with hands and feet, or by hanging by the hands alone. They are fixed usually about eight feet above the ground, either vertically or inclined at an angle. Frequently two of them are inclined together.

The Delsarte system of gymnastics is more properly a system of physical expression, and will be found treated at length under PHYSICAL TRAINING. In analyzing the organism, Delsarte (q.v.) taught that the voice was the language of physical life; gesture the language of emotion; and articulation the language of reason. Motion from the individual as a centre he termed *excentric;* motion to a centre, *concentric;* and motion between these two extremes, when they are properly balanced, *normal.* The exercises are so arranged as to develop to its fullest extent the ability of each organism to perform its part in the sensitive, moral, or intellectual transmission with which it is charged. The system commences with a series of æsthetic gymnastics, which include decomposing or devitalizing exercises for the fingers, hand, forearms, entire arm, head, torso, foot, lower leg, entire leg, entire body, eyelids and lower jaw; the harmonic pose of bearing as standing, change of centre of gravity forward, back, and sideways, rotation, and poise when seated; gestures from the significant zones, mental, moral, and vital; standing in significant attitudes; as well as the whole gamut of expression in pantomime. The Delsarte system is of particular importance in training for the stage, but it is also regarded as of great general value in the cultivation of nerve-control, as well as for physical expression.

The term *Swedish gymnastics* is usually applied in America to a system of physical training in the education of childhood and youth, which directs the muscular activity of the child toward the development of the mechanism of accustomed movements, such as walking, running, etc.; and subsequently the performance of exercises which employ large masses of coördinate muscles, and the cultivation of manual dexterity. The system does not aim to supply an athletic training, although it is an excellent prelude to such training. In Sweden the claim is made that they do not adapt their work to an apparatus, but their apparatus to their work; and that while they do not encourage the practice of difficult feats on fixed floor apparatus, they are enabled by their system to conserve the physical man during the period of his mental training, and thus endow him when he arrives on the threshold of manhood with a body physiologically capable of sustaining him in the work of his life. The Swedish system was first developed by Ling, who died in 1859, but it was not until between 1860 and 1870 that the several important discoveries of physiology were thoroughly incorporated into the training, and gave it the value it subsequently acquired.

BIBLIOGRAPHY. Wood, *Manual of Physical Exercises* (New York, 1867); Frobisher, *The Blood and the Breath: A System of Exercise for the Lungs and Limbs* (New York, 1876); Lewis, *The New Gymnastics for Men, Women and Children* (18th ed., Boston, 1882); Ling, *Swedish Gymnastics for Schools* (London, 1883); LeMaire, *Indian Clubs and How to Use Them* (London, 1889); Alexander, *Modern Gymnastic Exercises* (London, 1890); Jenkins, *Gymnastics* (New York, 1890); Posse, *The Swedish System of Educational Gymnastics*, trans. (Boston, 1890); Stebbins, *Delsarte System of Expression* (4th ed., New York, 1892); Lewis, *Home Gymnastics* (New York, 1892); Stebbins, *Dynamic Breathing and Harmonic Gymnastics* (New York, 1893); Posse, *Special Kinesology of Educational Gymnastics* (Boston, 1894); Nissen, *Rational Home Gymnastics for the Well and the Sick* (Boston, 1898).

GYMNEMA, jĭm-nē′mȧ (Neo-Lat., from Gk. γυμνός, *gymnos*, naked + νῆμα, *nēma*, thread), or COW-PLANT, *Gymnema lactiferum.* A climbing perennial shrub of the order Asclepiadaceæ, native of the East Indian Archipelago, the milky juice of which has been said to be used by the natives as a substitute for milk and cream, but which is believed to contain enough of the poisonous principle peculiar to the order to cast a doubt upon its reputed use.

GYMNOCLADUS, jĭm-nŏk′lȧ-dŭs (Neo-Lat., from Gk. γυμνός, *gymnos*, naked + κλάδος, *klados*, branch). A genus of trees of the natural order Leguminosæ. *Gymnocladus Canadensis* is a North American tree, found in rich bottom soils from Canada and the Eastern United States as far south as Tennessee and west to Indian Territory and Nebraska. It attains a height of 50 to 60 feet in cultivation, or 75 to 100 feet when growing wild. It is remarkable for its upright branches and its exceedingly rough bark. The leaves of young trees are very large, and bipinnate. The flowers are white in short spikes. The pods are 5 inches long and 2 inches broad. The tree is called chicot in China, and sometimes stump-tree, from its dead appearance in winter, and the absence of conspicuous buds. It is one of the last trees to put out its leaves, which are very ornamental when young. Its common name, Kentucky coffee-tree, was applied because its seeds were formerly washed and ground as coffee in Kentucky. The wood is used both by cabinet-makers and carpenters. It has very little sapwood. The pods, preserved like those of the tamarind, are said to be wholesome and slightly aperient. A second species, *Gymnocladus Chinensis*, occurring in the east of Asia, is a smaller tree. See Plate of GINKGO.

GYM′NODON′TES (Neo-Lat. nom. pl., from Gk. γυμνός, *gymnos*, naked + ὀδούς, *odous*, tooth). A suborder of plectognath fishes, which includes the puffers, sunfishes, porcupine-fishes, globefishes, and the like. These forms have no separate teeth, but the jaws are enveloped by an enamel-like covering. Many of them have the power of inflating their bodies, probably for protection. (See GLOBEFISH.) There are many species, mostly found in the warm seas.

GYM′NONO′TI (Neo-Lat. nom. pl., from Gk. γυμνός, *gymnos*, naked + νῶτος, *nōtos*, back). A suborder of eel-like fishes of the fresh waters of South America, named from the electric eel (see ELECTRIC FISHES), formerly called Gymnotus. The group embraces two families, re-

garded as being between the true eels and the eel-like siluroids (Clariidæ).

GYMNOPÆDES, jim'no-pē'dēz. See under *Plumage*, in the article BIRD.

GYM'NOPHI'ONA (Neo-Lat. nom. pl., from Gk. γυμνός, *gymnos*, naked + ὄφις, *ophis*, serpent). An order of small snake-like amphibians, with no trace of limbs or tail. The body is vermiform, the skin hardened to form scales, the eyes rudimentary, and the membranous skull complete and substantial. They are tropical burrowers, and number about 42 species, principally of the family Cæciliidæ. See BLINDWORM.

GYMNOS'OPHISTS (Lat. *gymnosophistæ*, from Gk. γυμνοσοφιστής, *gymnosophistēs*, naked sage, from γυμνός, *gymnos*, naked + σοφιστής, *sophistes*, sage, from σοφός, *sophos*, wise). The name given by the Greeks to those ancient Hindu philosophers, or religious devotees, who wore little or no clothing, and dedicated themselves to mystical contemplation and the practice of the most rigorous asceticism. They often adopted a solitary life in the forest, for which reason the Greeks termed them also *Hylobioi*, answering to *Vāna-prasthās* of the Sanskrit literature. They correspond to the yogis, fakirs, or 'holy men' of India to-day. According to Strabo there were two classes of these, the Brahmans and the Samanæans. The former adhered strictly to the rules of caste distinction; the latter did not. Calanus (q.v.), who allowed himself to be burned alive, was a type of these naked philosophers.

GYMNOSPERMS, jim'nō-spērmz (from Gk. γυμνός, *gymnos*, naked + σπέρμα, *sperma*, seed). A name applied to one of the two groups of seed-plants (spermatophytes), the members of which, as the name implies, bear naked seeds. The members of the other group, angiosperms (q.v.), bear seeds 'in a case.' The most familiar gymnosperms are pine, spruce, hemlock, cedar, etc., the forms commonly called 'evergreens.' The group is an ancient one; its representatives were abundant in the forest vegetation of the coal measures, but to-day only about 400 species exist as a remnant of a former much larger display. The gymnosperms are divided into four distinct living groups, and at least two extinct groups are known.

THE CONIFERS. The conifers form the most conspicuous modern group. They are characteristic of the temperate regions, and comprise the commonly known evergreens. Some forms are widely distributed, as the pines, which still form extensive forests. Others are now very much restricted, although they were once widely distributed, as the gigantic redwood (Sequoia) of the Pacific slopes. See CONIFERÆ.

THE CYCADS. The cycads, tropical fern-like forms, with large compound leaves, rank second in importance to the conifers. The stem is either a columnar shaft, crowned with a rosette of green leaves which give a palm-like habit, or it is like a great tuber crowned with leaves. In ancient times cycads were very abundant, but now they are represented by only about eighty forms, scattered through both the eastern and western tropics. See CYCADACEÆ.

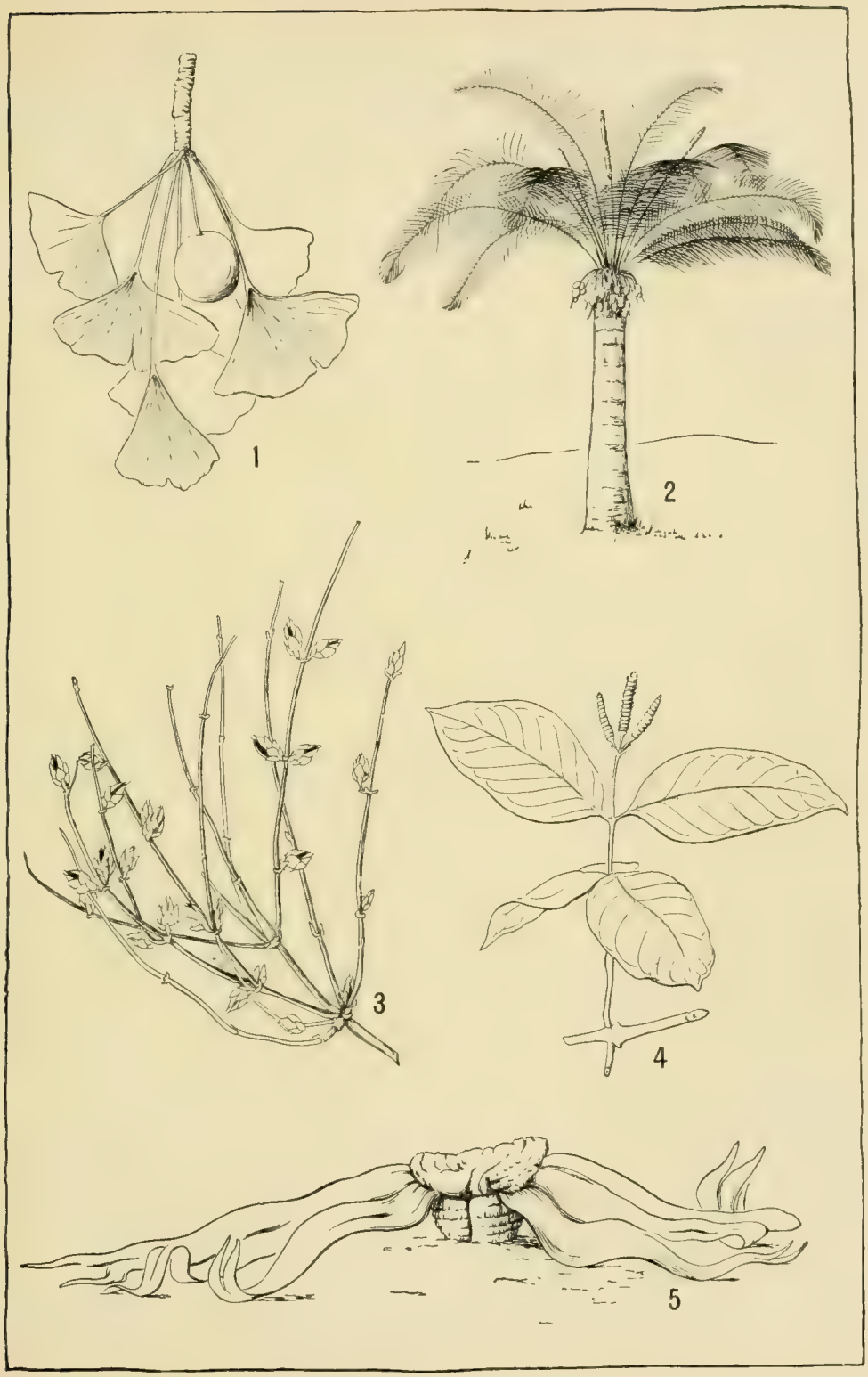
THE GNETUMS, some of which are of remarkable form, compose the third living group. There are but three genera, very distinct in appearance and in range. The genus Ephedra, which includes about thirty species, occurs in the dry regions of both hemispheres. In the arid region of the Southwestern United States characteristic species of Ephedra are low straggling bushes with long-jointed, fluted green stems, and opposite scale-like leaves. A second genus, Tumboa, better known as Welwitschia, contains only a single species, which occurs in certain extremely dry regions of West and South Africa. The body of these remarkable plants is shaped like a gigantic radish, which rises well above the surface of the ground, and whose circumference is sometimes over 12 feet at the crown, from the edge of which two enormously large leaves are produced. These extend upon the ground sometimes from 10 to 12 feet, and become weathered into ribbons. The third genus, Gnetum, contains fifteen species of trees or vines, and occurs in the tropics of both hemispheres, where some of the climbers are prominent.

THE GINKGO. The fourth great group of living gymnosperms contains at present but a single form, the Ginkgo, a remarkable tree almost unknown in the wild state, but recently reported in certain forests of Western China. Its extensive cultivation, however, in connection with temple worship in China and Japan has preserved it, and has introduced it as a well-known park tree in all civilized countries. The leaves so much resemble those of the maidenhair fern that they suggest the common name 'maidenhair tree.' The fruit is plum-like. See GINKGO.

It is thought that gymnosperms have been derived from the ferns, from which they differ most strikingly in their production of seeds. Among the numerous other characters which separate the gymnosperms from the angiosperms, it may be mentioned that the female generation (gametophyte) developed within the ovule (see ALTERNATION OF GENERATIONS) bears such female organs as are found in the ferns and the mosses (archegonia); in angiosperms no such organs are found. Again, in gymnosperms the body of the stem is chiefly composed of the peculiar form of vessels called tracheid (q.v.), which differ from the true vessels of angiosperms in not forming somewhat continuous passageways. These tracheids are formed so regularly that the wood is remarkably uniform and of even grain, a feature characteristic of the lumber obtained from pines and their allies. The fruits of gymnosperms are diverse, and from the fact that the seeds are not inclosed they are different in character from those of angiosperms. The best-known form of fruit is the prominent cone that gives name to the group Coniferæ. These cones enlarge very much during the formation of the seeds, and consist of an axis bearing numerous bract-like members to the upper surface of which the seeds are attached. In the case of the cycads and ginkgo, the seed itself ripens and resembles a fleshy stone fruit, such as a plum or cherry. To botanists gymnosperms are of chief interest because of their relations to the ferns and to the angiosperms. The largest problems in connection with the group have to do with the details of their origin from the ferns, and with the more obscure question as to whether they in turn may have given rise to the angiosperms.

In addition to the books cited under MORPHOLOGY, all of which treat more or less fully of this group, consult Coulter and Chamberlain, *Morphology of Spermatophytes*, part i. (New York, 1901). For works on classification, see under TAXONOMY. See DISTRIBUTION OF PLANTS.

GYMNOSPERMS



1. GINKGO
2. CYCAS
3. EPHEDRA
4. GNETUM
5. TUMBOA (Welwitschia).

GYMPIE, gim′pī. A gold-mining town of March County, Queensland, Australia, on the Upper Mary River, 107 miles north of Brisbane by rail (Map: Queensland, H 9). Population, in 1901, 11,959.

GYNÆCEUM, jin′ē-sē′ŭm (Lat., from Gk. γυναικεῖον, *gynaikeion*, women's apartments, from γυναικεῖος, *gynaikeios*, relating to women, from γυνή, *gynē*, woman). The apartments for women in ancient Greek houses. In the fourth century A.D. and later, the term was applied to large factories where slaves of both sexes wove and made up clothing of fine stuffs for the imperial families, and also of coarser materials for the soldiers. These factories were in direct dependence on the Emperor and under the supervision of imperial officers.

GYNÆCOLOGY, jī′nē-kŏl′ŏ-jī (from Gk. γυνή, *gynē*, woman + -λογία, *-logia*, account, from λέγειν, *legein*, to say). That branch of medicine which treats of diseases and affections peculiar to the physical organization of women. All operative work upon the female genital apparatus is called gynæcological surgery. But childbirth and the care of the parturient woman belong to the domain of OBSTETRICS (q.v.). Consult Kelly, *Operative Gynæcology* (New York, 1898).

GYOMA, dyō′mŏ. A town of Hungary, in the county of Békés, situated on the Körös, about 114 miles east-southeast of Budapest by rail (Map: Hungary, G 3). The country is extremely fertile and produces much grain and fruit. Cattle and sheep are raised in considerable numbers, and the fishing is also important. Population, in 1900, 11,545, mostly Magyar Catholics.

GYÖNGYÖS, dyēn′dyēsh. A town of Hungary, in the County of Heves, situated at the base of the Mátra Mountains, about 60 miles northeast of Budapest (Map: Hungary, F 3). The town has a gymnasium and a large Franciscan monastery. It manufactures bricks, alcohol, and copper goods, and carries on a large trade in grain, cattle, and particularly wine, the vineyards yielding the grape which produces the fine Erlauer wine. In the vicinity are excellent medicinal baths. Population, in 1900, 16,442, nearly all Magyar Catholics.

GYP, zhēp. The nom-de-plume of the French writer Sibylle Gabrielle Marie Antoinette de Riquetti de Mirabeau, Comtesse de Martel de Janville. See MARTEL DE JANVILLE.

GYPSIES. A singular race of wandering tribes, scattered through Western Asia, all the countries of Europe, and Northern Africa, and found, where the tide of modern immigration has flowed, in North and South America and in Australia. From the standpoint of ethnography and language alike they present one of the strangest problems with which modern scholarship has to deal. Dwelling in the midst of highly civilized nations, associating in the daily life of diverse peoples, they yet retain their physical and racial characteristics and their peculiar language wherever they may live. No similar phenomenon is to be observed in all the world. The nearest parallel is to be found in the Jews, who, also scattered among the nations of the earth, retain the distinguishing characteristics and customs of their race; but the Jews are numerous and powerful, and have the influence of a long history and strong traditions, not to speak of the bond of their ancient religion. The gypsies, on the other hand, are isolated, unlettered, the despised of the earth; with no common bond of religion, history, or tradition. It is an unexplainable native instinct that holds them together in communities and roving bands, that keeps them apart from the rest of the world, and that drives them to endless, restless roaming. It is in their blood to love the open-air, nomadic life; and even where education or self-interest leads them here and there to adopt the settled habits of civilization, the old native instinct returns at times and forces them from house and town to the wandering life in the fields.

NAME. In his own language a gypsy calls himself and his race *Rom*, i.e. 'man,' *the man par excellence*, for all the rest of mankind he defines under the generic term *gäjo* (English-gypsy dialect *gajo*), 'gentile.' His wife is *romni*, and all that characterizes him and his ways is summed up in the term *romnipen*, while his language is *romani*. The gypsy of each country accepts the name applied to him by the people, but knows not what it means. These local names are as varied as the countries in which he lives; but if we except the many appellations of gypsy-like tribes in the East (the Luri and the Karachi in Persia, Nowars in Syria, Jāt and Sinti in India, etc.), of which but little is known, they may be reduced to three general categories: (1) Those referring to the supposed origin of the tribe; (2) a group of allied names of uncertain etymology; (3) depreciatory appellations, such as 'heathen' and 'outcasts.' Instances of the third class occur in Holland, where the gypsies are known as *Heidenen*, 'heathens,' and in Egypt, where they are *Harami*, i.e. 'robbers.' To the second group belong most of the appellations of Eastern Europe and Germany. Early Byzantine writers (ninth to twelfth century) speak of the wandering tribes under the name ἀτσίγκανοι, whence the gypsies in Turkey are to-day called *Chingiané*, in Bulgaria *Ciganin*, in Rumania *Ciganu*, in Hungary *Czigány*, in Bohemia *Cinkān*, in Germany *Zigeuner* (Old German *Ziginer*, *Zigeiner*), in Italy *Zingari*. To their emigration from the East we owe the first group of appellations; a very general, but wholly false, belief that they had wandered into Europe from Egypt led the Greeks to call them Γύφτοι, the Albanians *Jevk*, the Turks *Färäwni* (i.e. 'Pharaohs'), the Hungarians *Faraonépe* (or Pharaoh's people), Spaniards *Gitanos*, and the English in olden times *Egipcions*, whence *Gypsies*. Similarly in Denmark, Sweden, and Northern Germany they are designated as *Tatars*, and in France *Bohémiens*.

ORIGIN AND ETHNIC TRAITS. Of their own origin the gypsies can give no sensible account. They are apt, at least those of Western Europe, to follow the popular belief that they came originally from Egypt. Among the many authors that have written about them from the fifteenth century to recent times the most diverse and absurd theories have been advanced. A fanciful resemblance in their German name *Zigeuner* led early writers to trace them to Zeugitania (Tunis), or to Singara, in Mesopotamia. Others have sought to trace them to the Saracens, the Jews, the Amorites, the Canaanites, the Lost Tribes of Israel, or the 'mixed multitude' that followed Moses out of Egypt. It was the comparison of their language that gave the first clue

to their real origin. As early as 1776 a certain Captain Székely published a letter in a Viennese review, in which he mentioned that an Hungarian clergyman named Vályi, during his student days at the University of Leyden, had become acquainted with some fellow students from Malabar, in India, and had acquired from them a small vocabulary of Malabar words. On his return to Hungary he read his list to some gypsies, who understood almost every word. In 1783 two Germans, Rüdiger and Grellmann, writing on the gypsies, arrived independently at the conclusion of their Indian origin. The growing study of Sanskrit and the modern Indian languages drew further attention to that of the gypsies, and in 1844-45 Pott published a monumental work, *Die Zigeuner in Europa und Asia*, in which was fully set forth the Hindu origin of 'romani.' There can be no further question of the fact that the gypsies are an Indian race, and every step in the study of their language and racial type tends still more to confirm the fact. It is unnecessary here to treat in detail the many investigations of Bataillard, MacRitchie, De Goeje, Miklosich, and others, that seek to connect them closely with one or another of the wild tribes of Northwestern India. A few words taken at random will serve sufficiently to show the Hindu origin of their language:

English	*Gypsy*	*Sanskrit*	*Modern Hind.*
coal	*angar (wangar)*	*angāra*	*ungara, vangar*
two	*dui*	*dva, dvi*	*dō*
to do	*ker*	*kr*	*kurnā*
man	*manush (mush)*	*manushya*	*manus*
mouth	*mui*	*mukha*	*mukh*
nose	*nak*	*nasa*	*nak*
five	*panch*	*panchan*	*panch*
gentleman	*rai*	*rāja*	*rāja*
lady	*rani*	*rāgni*	*rāni*
golden	*sonakai*	*svarna*	*sonakai*
four	*shtor*	*chatur*	*char*
three	*trin*	*tri*	*tin*
hand	*wast*	*hasta*	*hath*
fire	*yag*	*agni*	*yag*
eye	*yak*	*akshi*	*aukh*
one	*yek*	*ēka*	*yek*

In appearance, the full-blooded gypsy is rather undersized, with swarthy complexion, oval face, and regular features, often very handsome. He has very black hair, piercing dark eyes, white teeth, a lithe figure, and small hands and feet. Kopernicki studied twenty gypsy crania in a hospital at Budapest, and found a very striking resemblance to the Hindu crania of low caste. The gypsy marries early. The young girls are often very beautiful, but their beauty soon fades. As a race the gypsies are long-lived; it is not unusual to find very aged men and women, exceedingly wrinkled, but robust and active. They retain their deep-black hair until a great age.

Sketch of Their Migrations. At precisely what period the gypsy hordes left their early home in Northwestern India and commenced their long migration into the west cannot be determined. Historical information on this point is entirely wanting; but their language affords sure evidence of the course of their wanderings, for their sojourn in each country has left its impress on their vocabulary. In addition, we are so fortunate as to have some slight records of their early apparition among the nations of Europe. They must have left their original home not later than the year 900, and how much before it is quite impossible to say. Perhaps the irruption of the hordes of Genghis Khan moved them from their earlier abode and started them on their long march of centuries. They evidently took the direction of Kabulistan and Persia, and made a lengthy stay in each of these countries, as the presence of Kabul and Persian words in their language amply proves. Here they seem to have split into two main divisions, the one striking south through Syria into Egypt and Northern Africa, where their descendants are still to be found in considerable numbers; the other migrating west through Asia Minor into Turkey in Europe. Here they receive from the contemporary Byzantine writers the appellation of *Athinganoi*, or *Atsinkanoi*, the origin of the various names by which they are familiarly known in the different countries of Eastern Europe and in Germany. Greece and the Greek-speaking countries of Southeastern Europe were their earliest abiding place on the European Continent, and there is no way of deciding how many decades or centuries they roamed about here before pushing their restless way still farther to the west. As early as 1398 we have mention of a gypsy chief named John as established with certain feudal privileges at Nauplia, in the Peloponnesus, under Venetian rule; and numerous ruined castles in that country still bear the name *Γυφτόκαστρον*, or gypsy castle, from the name by which they are known in Greece, *Γυφτοί*, or 'Kopts.' Earlier still, in 1370, we find feudal settlements of gypsies in certain parts of the island of Corfu—a sort of gypsy 'ghetto,' or reservation.

Early in this same century large bands of gypsies began to stream north from Greece and Turkey into the wild and scantily populated Balkan countries, especially Wallachia, where they found ample room to gratify their nomadic instincts unmolested, and throve and increased in numbers amazingly. From here they readily found their way in vast numbers into Transylvania and Hungary. They were settled in these countries already before 1417, and the plains of Hungary and the mountains of Transylvania may be regarded as the second important station in their European wanderings. They form an important and not useless part of the population, devoting themselves to a limited number of nomadic occupations, notably the simpler kinds of smith work and music, and are neither maltreated nor despised by the people.

The first appearance of the gypsies in Germany is recorded in 1417. At about the same time other bands passed through the whole of Europe. They are recorded in Switzerland in 1418; in Denmark, 1420; in Italy, 1422; in France and Spain, 1447; in Poland and Russia, about 1500; in England shortly after. At first they were treated kindly, and assisted in their poverty alike by people and Government; but their thievish habits soon caused them to be driven from place to place, and stringent laws were frequently passed against them. This probably explains their sudden appearance in such distant parts of Europe at about the same period. The curious notion that they were of Egyptian origin was already widespread, and the gypsies themselves found it to their purpose to lend credence to it. They invented an imaginary 'Little Egypt,' and their chiefs, riding their well-kept horses, clad in many-colored garments and coin-bedecked, and followed by the miserable rabble of their tribe, posed as 'counts' and 'dukes' and 'kings' of that land; or gave out that they were pilgrims on

their way to Rome to do penance for apostasy, thus gaining the aid and good wishes of the simple. A large band wandered into Italy under the leadership of a 'duke of Egypt' named Andrew, and encamped before the gates of Bologna on July 18, 1422. The 'duke' himself entered the city and took lodgings at the 'Albergo del Re,' displaying a passport for himself and his tribe, signed by Sigismund, King of Hungary, and explaining to the town authorities that he and many others of 'Little Egypt' had turned against Christianity and consequently had been driven from their country by King Sigismund. He himself, and 4000 of his people, had thereupon decided to renounce the error and return to the Church; and the King, after putting to death the most obstinate renegades, had imposed upon the others a penance of seven years' wandering and the obligation of going to Rome to get the Papal absolution, as a condition of receiving back their lands and goods. For five years had they already wandered, and now were approaching Rome. This story served the 'duke' well for several years; but the imposition was ultimately discovered, and the whole band was expelled from Italy. In 1429 we find the city of Arnhem, in Gelderland, furnishing money and provisions "to the Count of Little Egypt, with his company," and another item "to the same count and the heathen women, for the honor of God." In 1459 the town of Zutphen made a like present to the 'King of Little Egypt,' and Duke Egmont granted a passport to "Count Martin Gnougy, *geboren van Klijn-Egypten*, so that he might be helped on his pilgrimage." Many more instances might be cited; and it may be observed that in all these cases the gypsies were from Hungary, and strangers in the lands through which they were wandering. In the course of time their fraud was naturally exposed; and then the 'dukes' and 'counts,' reduced to common vagabonds, either retraced their path to Hungary or remained with their tribes and became severally German and Italian and Dutch gypsies. As such they were treated as outcasts and often rigorously persecuted. In Germany, acts of banishment were passed against them in 1479, 1500, 1544, 1548, and 1577, each more stringent than the last; and that of 1725, under Frederick William I., was the most cruel of all: "Gypsies, whether men or women, that are caught in the Prussian States, if over eighteen years of age, shall be sent to the gallows without mercy, and may previously also be punished with branding and flogging, whether they have come into the country for the first time singly or in company, and whether they have passes to show or not." Christian III. of Denmark gave the gypsies three months to leave the country in 1536, under penalty of death in case of return, and a similar royal edict was passed against them by Sweden in 1662. In France they were never allowed to gain a foothold. Hungary, Rumania, Poland, Russia, and England, on the contrary, have on the whole been generous to them, they have thriven in Spain, and Italy has tolerated the comparatively few that dwell there. To-day the tent-dwelling gypsies seldom pass from one country to another; they have become habituated to their adopted country, and with the growth of popular education and the increasing difficulty of leading the nomadic life, they are gradually losing their peculiar character and becoming assimilated to their neighbors. Their last migration is to the New World or to Australia; and here, in new surroundings, many thousands are already living, mostly English gypsies, but also bands from the Continent, especially from Hungary and the Balkan States. The gypsies are most numerous in Rumania and various parts of the Balkan region, Hungary (with Transylvania), and Russia. Their aggregate number in these countries is in the neighborhood of 500,000. On the migrations of the gypsies, consult especially Von Wlislocki, *Vom wandernden Ziegeunervolke* (Hamburg, 1890).

LANGUAGE. It is a very prevalent impression among English-speaking people that the language of the gypsies is a simple jargon or cant. Nothing could be further from the truth. The broken dialect of the English gypsies, indeed, is a strange mixture of English and *romani*, in which the grammar has almost wholly disappeared, and it is this fact that has created the popular impression. But in the farther East, where the race is more compact and has preserved far better its habits and instincts, *romani* is a true and complete language, with a considerable vocabulary and a highly developed system of inflections. A brief characterization is all that is possible here; but the student is referred to the list of valuable works appended to this article.

There are fourteen distinct dialects of *romani* in Europe: (1) The Greco-Turkish, (2) Rumanian, (3) Hungarian, (4) Slavonian, (5) Polish-Lithuanian, (6) Russian, (7) Finnish, (8) German, (9) Scandinavian, (10) Italian, (11) Basque, (12) Spanish, (13) Anglo-Scotch, (14) Welsh. Any one of these dialects is not easily intelligible to the speakers of the others. The purest are those of Turkey, the Balkan States, and Hungary-Transylvania; the most corrupt are those of England, Scotland, and Spain. We may first select the dialect of Turkey as an example of the pure *romani*—the *lacho romano chib*—and then illustrate its corruption in the hybrid dialect, the *pŏsh* and *pŏsh romani*, of the English gypsies. For the Turkish dialect we owe our accurate knowledge to Dr. Alexander G. Paspati, of Constantinople, whose extensive researches are summed up in his *Etudes sur les Tchingianés, ou Bohémiens de l'Empire Ottoman* (Constantinople, 1870).

ALPHABET. As romani is not a written language, it properly has no alphabet; but it is very rich in sounds, both vowel and consonantal.

ARTICLE. (a) Definite masc. *o*, fem. *i*, from the Greek ὁ, ἡ. (b) Indefinite: *Yek*, properly 'one.' Examples: *o rakló*, 'the boy'; *i rakli*, 'the girl'; *yek chavó*, 'a child.'

NOUN. There are two genders, masc. and fem. Nouns may terminate equally in vowels and consonants. All nouns are fully declined, and there are eight cases, as follows:

	Masc.	Fem.
	rakló, 'boy'	*rakli*, 'girl'
Sing. Nom.	*rakló*	*rakli*
Gen.	*rakléskoro*	*rakliákoro*
First Dat.	*rakléste*, 'to the boy'	*rakliáte*, 'to the girl'
Second Dat.	*rakléske*, 'in the boy'	*rakliáke*, 'in the girl'
Acc.	*raklés*	*rakliá*
Voc.	*raklévа*	*raklié*
Instr.	*raklésa*	*rakliása*
Abl.	*raklésta*	*rakliátar*
Plur. Nom.	*raklé*	*rakliá*
Gen.	*raklengoro*	*rakliengoro*
First Dat.	*raklende*, 'to the boys'	*rakliende*, 'to the girls'

	Masc.	Fem.
Second dative	*rakléngke*, 'to the boys'	*rakléngke*, 'to the girls'
Acc.	*raklén*	*raklén*
Voc.	*raklále*	*raklále*
Instr.	*rakléndja*	*rakléndja*
Abl.	*rakléndar*	*rakléndar*

Examples: *E romeskero raklé tu rakliá*, 'the boys and girls of the gypsy.' *Terasa yek rakles*, 'we have a boy.' *E rakloa e penela o raklo*, 'the boy says to the girl.' *So soron romale?* 'why do you sleep, O gypsies?'

Adjective. Masc. ends in *-ó*, fem. in *-í*. Exceptions are rare, as *shukár*, 'beautiful'; *yavér*, 'other.' All the oblique cases and the entire plural end in *e*. Examples: *lachó chavó*, 'good child'; *laché chavéskoro*, 'of the good child'; etc.

Pronouns. These are fully declined, like the nouns. The personal pronouns are *me*, 'I'; *tu*, 'you' (singular); *ov*, 'he'; *oi*, 'she'; as follows:

Singular

Nom.	*me*	*tu*	*ov*	*oi*
Gen.	*mángoro*	?	*léskoro*	*likoro*
First Dat.	*mánde*	*túte*	*leste*	*líte*
Second Dat.	*mánghe*	*túke*	*lésko*	*like*
Acc.	*man*	*tut*	*les*	*ka*
Voc.	*me*	*tu*	.....	..
Instr.	*mándja*	*túsa*	*lésa*	*lísa*
Abl.	*mándar*	*tútar*	*lestar*	*lítar*

Plural

Nom.	*amén*	*tumén*	*oe*
Gen.	*aménguoro*	*tuméngoro*	*léngoro*
First Dat.	*amende*	*tumende*	*lende*
Second Dat.	*aménghe*	*tumenghe*	*lénghe*
Acc.	*amén*	*tumén*	*len*
Voc.	*amén*	*tumén*	.....
Instr.	*amendja*	*tumendja*	*léndja*
Abl.	*amendar*	*tumendar*	*léndar*

Examples: *Me isóm*, 'I am'; *pendé manghé*, 'they said to me'; *tu penghiás amenghe*, 'you (sing.) said to us'; *dikliás la lákoro dat*, 'her father saw her'; *asálas lasa*, 'he laughed with her.' The possessive pronouns are *mo*, 'my' (fem. *mi*; oblique cases and plural *me*); *to*, 'your' (sing.; fem. *ti*; oblique cases and plural *te*); *minró* (fem. *minrí*), 'my'; *tinró* (fem. *tinrí*), 'your,' 'yours' (sing.); *léskoro* (fem. *lákoro*), 'his,' 'hers'; *amaró* (fem. *amarí*), 'ours'; *tumaró* (fem. *tumarí*), 'yours' (plur.); *léngoro* (masc. and fem.), 'their,' 'theirs.' The demonstrative pronouns are: *aká* or *avaká*, 'this' (fem. *akiá* or *avakiá*, plur. *aklé* or *avaklé*). The interrogative is *kon*, masc., fully declined; and *so*, defective, neuter; and the relative is *ka*, indeclinable. Examples: *Mo chavó*, 'my boy'; *mi raklí*, 'my girl'; *me charé*, 'my children'; *to vast*, 'your (sing.) hand'; *tinró sukaribé*, 'your (sing.) beauty'; *léskoro grast*, 'his horse'; *léskere dant*, 'his teeth'; *lákoro pral*, 'her brother'; *aká rakló*, 'this boy'; *avaklé gavéste*, 'in this village'; *kon kachél*, 'who will be left?' *ta tu, so penés mánghe*, 'and you, what do you say to me?'

Numerals (all Hindu, except 'seven,' 'eight,' 'nine,' from the Greek): *Yek*, 'one'; *dúe*, 'two'; *trin*, 'three'; *shtar*, 'four'; *ponch*, 'five'; *shov*, 'six'; *eftá*, 'seven'; *okhtó*, 'eight'; *enéa*, 'nine'; *desh*, 'ten'; *desh-u-yek*, 'eleven,' etc.; *bish*, 'twenty'; *bish-u-yek*, 'twenty-one,' etc.

Verbs. The conjugation of verbs, regular and irregular, is exceedingly complex and full. As a general example, the regular verb *dáva*, 'to give,' will suffice.

Present

dáva, 'I give'	*dása*, 'we give'
désa, 'you give'	*déna*, 'you give'
déla, 'he gives'	*déna*, 'they give'

Imperfect

dávas	*dásas*
désas	*dénas*
délas	*dénas*

First aorist

dinióm	*dinióm*
dinión	*dinión*
dinión	*dinión*

Second aorist

dinióm	*dinióm*
dinión	*dinión*
dinión	*dinión*

Future

kamadáva	*kamadása*
kamadésa	*kamadéna*
kamadéla	*kamadéna*

Imperative

de, 'give!' *den*, 'give!' (plur.)

Subjunctive

te dáva	*te dása*
te désa	*te déna*
te déna	*te dena*

Participle

dinó 'taken' (fem. *diní*; plur. *diné*).

Examples: *Kerava*, 'I make'; *terélas but chavén*, 'he had many children'; *so kamavéla*, 'what will come?' *me chinghióm les*, 'I killed him.'

It will readily be seen from the above résumé that *romani*, where well preserved, is a fully developed and highly inflectional language. This character it has kept where the gypsies live in large numbers, as in Hungary, for instance; but in every country it has received many influences from without. In Hungarian, the word-accent falls invariably on the first syllable, and this has influenced the Hungarian dialect. Thus, what would be pronounced *rakló*, 'boy,' *raklí*, 'girl,' in Turkey, would become *ráklo*, *rákli*, in Hungary and in all the gypsy dialects of the farther west.

A word about the corrupt English dialect. When the gypsies arrived in England, early in the sixteenth century, they spoke *romani* of a pure and inflectional character. But association with the country people, and especially with the questionable gentry of the horse-fairs and the roads, caused their speech to become more and more corrupt, until to-day it is the English grammar applied to several hundred gypsy words. The old gypsy men and women who spoke the 'real language,' *tacho romani jib*, are dead, and their descendants have forgotten it; but fortunately scholars took it from their lips before it disappeared. Almost every inflected form of *romani* may be found in the English dialect. Thus, of the verb: *keráva*, *kerésa*, *keréla*, *keréna*, *kérdo*. "I, you, he, they make,' 'made,' are recorded; but the English gypsies of to-day, instead of *me keráva*, 'I make,' say *mánde kers* (using the English vulgar termination *-s* in 'I makes'), *tute kers*, *lesti kers*, etc. The migrations of the English gypsies are very discernible in their language. The basic stock is Indian; the Persian has supplied many words, as *devruál*, *dovyál*, 'sea,' *vesh* or *wesh*, 'forest'; the Armenian several, as *grast*, 'horse,' *chor*, 'deep'; not a few are from the Greek, as *drom*, 'road' (δρόμος), *pet'l* 'horseshoe' (πέταλον), *stadi*, 'hat' (σκιάδι); the Slavic languages have furnished, among others, *krális*, 'king,' *kíchĕma*, 'inn,' *lovínor*, 'beer;' while German is represented by *stifi-pal* and *stifi-pen* (*Stief*bruder, *Stief*schwester), and French, as some think, by *bíti*, 'little' (*petit*).

Representative specimens of several romani dialects are here appended for comparison. Non-romani words and forms are given in italics.

Turkish Dialect (Paspati, p. 600): Yek

A

dakár térelas trinén raklén, diniás e khurdés

king had three sons he gave to the youngest

hiliades [Greek] *ghrosha* [Turkish], diniás e
one hundred piastres he gave to
thousand the
barés ta e maskaritnés. Ufkinótar o khurdó, liás
eldest and the middle Up rose the youngest, took
[the same].
o baró drom, kárin t'arakélas choré délas lové,
the long road, every-where that he found poor people, gave he money,
akaring okoring diniás len khalias o lové.
here there gave he scattered them, he the money.

HUNGARIAN DIALECT (Von Wlislocki, p. 286): Oh dädoro, báro ruk ándro bes, tu pélyäl, tu men
Oh dear father, great tree in the forest, you have fallen, you us
múklyäl! Ámeu ávnäs túte cárä. Ákänä nä hin
have left! We were your grasses. Now not is
mónge úshälyin. Ámeu ávnäs tut' chiriklä!
to us shade. We were your birds'
Ákänä nä hin rúkä! Kai úshälyin th'áräkäs, kai
Now no are trees! Where shade to find, where
rúkä th' äräkäs?
trees to find?

BOHEMIAN DIALECT (Ješina, p. 133): Kai jas,
Where go you,
mále? Jav ándro foros. So hi odoí túke te kérel?
friend? I go into town What is there for you to do?
Mri rómni odoí géyas ókia the n'ável pále; na
My wife there went away and not comes back; not
jänav so pes lake tálindyas.
I know what to her has happened.

GERMAN DIALECT (Liebich, p. 269): Ap o yek
Upon a
dívio grai klísyas givéses yek dsískero chávo. Goi
wild horse rode proud a spirited boy. Then
péndas o divio gúro graieske: "Laj! Tu múkyal
said the wild bull to the horse: "Shame! you allow
te ríkkervel tut yek chávester?" "Ava," péndas
to hold you a boy?" "Yes," said
o grai, "har pátib véles mánge, yek cháves te
the horse, "How honor come to me, a boy to
chivervâva téle?"
throw down?"

ENGLISH DIALECT—old pure form (Smart and Crofton, p. 215): Dósta dosta bésha ghiás koná
Many, many years gone now
sas *a* [Eng.] báro krális adrā Anghiterra. Ed-
was a great king in England. Ed-
wardus sas lésko nav, kúshto kómelo rai sas-lo.
ward was his name, good lovely gentle-man was he.

ENGLISH DIALECT—modern corrupt form: *Where's yer* jal'*in' to* ăch *yer* tăn? *We doesn't*
Where's yer goin' to pitch yer tent? We doesn't
jin. *We* pens *we'll* dik *some* kushto tăn *to* ăch
know. We thinks we'll see some nice place to camp
adoí aprā *the* drum adoí. Mándi pens *I* jin *a*
there in the road there. I thinks I know a
kúshto tăn *to* ăch akaí *under* dóva rúkya. *There's*
nice place to camp there under those trees. There's
shade adoí, *and* chor *for the* grais, *and* dústa
shade there, and grass for the horses, and plenty
pám, yúso *for the* chals *to* pē. Jal *with* mándi,
water, clean for the gypsies to drink. Go with me,
ta mándi'*ll* siker túte *the* kúshto tāu.
and I'll show you the nice place.

RELIGION AND FOLK-LORE. Of the religion of the gypsies there is little to be said. On the one hand they are not idolaters, nor on the other have they any well-defined religious ideas. They may go by the name of Christians or Mohammedans, according to the religion of the people among whom they live, but at best they attach little vital significance to religious rites and worships. Their religious attitude was probably the same on their arrival in Europe; they brought with them their Indian religion, but so slightly grounded that it was easily obscured, and then wholly lost. A curious proof of this is to be found in the romani word *trúshul*. The *trishūla* in Sanskrit is the three-pointed spear, or trident, borne by the Hindu god Shiva. From India the gypsies brought the word, along with a vague memory of the old god; but, arrived in Christian countries, they speedily forgot Shiva, and transferred his symbol, the trident, to the symbol of the Christian religion—the Cross; and all over Europe, in England as in Turkey, the *trúshul* is the Cross of Christ.

It is stated in many books on the gypsies that they have no conception of God, and that there is no word for God in their language. This is wholly false. The name of God is to be found in every gypsy dialect, and is of pure Hindu origin: *Devél* (Skt. *dēva*, 'god,' Avesta *daēva*, 'an evil genius,' Lat. *deus*). The English gypsy calls God *o bóro Dúvl*, 'the great God,' or *mi-dúvl*, 'my God.' The gypsy conception of God is partly pantheistic, but largely anthropomorphic. It varies, of course, with the grade of culture of the tribe. In England the gypsy is, to all intents and purposes, a Protestant Christian, with theological notions of a very vague sort, and rather indifferent in the matter of devoutness; but often, in individual cases, he becomes an ardent evangelist and missionary. At the other extreme, geographically and racially, the gypsy of Eastern Europe is almost a pagan, so rich is his mythology and folk-lore in supernatural beings, male and female, benign and pernicious, of every grade. It would be impossible in a limited space to give an adequate idea of the complete mythological system, for example, of the Transylvanian gypsies as recorded by Wlislocki. They have developed a thorough cosmogony; and the sky and woods and streams are peopled in their imagination with numberless beings, whose influence must be sought and whose vengeance must be averted with amulets and charmed words. Not an illness, not an animal in nature that does not have its 'spirit'; and every 'omen,' every coincidence, every dream has its portentous meaning.

PECULIAR CUSTOMS, ETC. The gypsy, wherever he lives, inclines naturally to some occupations rather than others, and especially to those that admit of a roving life, or, at least, of a life in the open air. He is universally a mender of pots and pans, and in the East, where the gypsies are settled in communities, they engage in many employments, such as smithing, basket-making, and the like. Horse-trading is a favorite means of livelihood, and almost the only one in England and America. The women 'tell fortunes,' and gained no small profits by their skill in more credulous days, while even now they earn a good living in this way from the frivolous. In Hungary especially, but also in Russia and Poland, the gypsies are noted as musicians, and Liszt himself has borne tribute to their genius. (See his work on Gypsy music, cited below.) This music is wild and wonderfully effective, being

wholly by ear and most accurate in technique. In their relations with *gāje* (gajos) or non-gypsies, they are genial, friendly, ready to do business; but in matters pertaining to themselves, their life, and language, often inclined to be reticent. When, however, they have confidence in a non-gypsy friend, their sincerity and fidelity know no bounds. Much has been written about the gypsies in a spirit of hostile prejudice or commiseration; it must be admitted, none the less, that those who have gained their confidence and learned their ways and their point of view, have always spoken well of the romani.

BIBLIOGRAPHY. Baudrimont, *Vocabulaire de la langue des Bohémiens habitant les pays basques français* (Bordeaux, 1862); Bischoff, *Deutsch-Zigeunerisches Worterbuch* (Ilmenau, 1827); Borrow, *The Zincali, or an Account of the Gypsies of Spain* (London, 1861); id., *Romano Lavo-Lil, Word-book of the Romany* [English dialect] (ibid., 1874); Colocci, *Gli Zingari* (Turin, 1889); Dirks, *Geschiedkundige Onderzoekingen aangaande het Verblijf der Heidens of Egyptiers in de noordelijke Nederlanden* (Utrecht, 1850); Drylund, *Tatere og Natimandsfolk i Danmark* (Copenhagen, 1872); De Goeje, *Bijdrage tot de Geschiedenis der Zigeuners* (Amsterdam, 1875); Grellmann, *Die Zigeuner* (Dessau, 1783); Graffunder, *Ueber die Sprache der Zigeuner* (Erfurt, 1835); Groome, *In Gipsy-tents* (Edinburgh, 1880); Ješina, *Romani-Cib oder die Zigeuner-Sprache* (Leipzig, 1886); Archduke Joseph of Austria-Hungary, *Czigány Nyelvtan* (Budapest, 1888); Kalina, *La langue des Tziganes slovaques* (Posen, 1882); Leland, *The English Gypsies and Their Language* (London, 1874); id., *The Gypsies* (ibid., 1882); Liebich, *Die Zigeuner in ihrem Wesen und in ihrer Sprache* (Leipzig, 1863); Liszt, *Des Bohémiens et de leur musique en Hongrie* (Leipzig, 1881); Miklosich, *Ueber die Mundarten und die Wanderungen der Zigeuner Europas* (Vienna, 1872-80); Paspati, *Etudes sur les Tchinghianés, ou Bohémiens de l'Empire Ottoman* (Constantinople, 1870); Pott, *Die Zigeuner in Europa und Asien* (Halle, 1844-45); Simson, *A History of the Gypsies* (New York, 1878); Smart and Crofton, *The Dialect of the English Gypsies* (London, 1875); von Sowa, *Die Mundart der slovakischen Zigeuner* (Göttingen, 1887); Sundt, *Beretning om Fante-eller Landstrygerfolket i Norge* (Christiania, 1853); Von Wlislocki, *Vom wandernden Zigeunervolke* (Hamburg, 1890); id., *Volksglaube und religiöser Brauch der Zigeuner* (Münster, 1891); id., *Aus dem inneren Leben der Zigeuner* (Berlin, 1892).

GYP'SUM (Lat., from Gk. *γύψος, gypsos*, chalk, probably of Semitic origin, cf. Ar. *jibs*, gypsum, from *jabasa*, to walk haughtily). A hydrated calcium sulphate composed of lime 32.56 per cent., sulphuric acid 46.51 per cent., and water 20.93 per cent. It crystallizes in the monoclinic system, has a hardness of 2, and a specific gravity of 2.31. The crystals are found in beds of massive gypsum, in veins, or scattered through beds of marl and clay. When transparent they are called selenite. Alabaster is a massive white, opaque variety of gypsum, and satin spar is a fibrous variety. A loose, earthy gypsum found in Kansas passes under the name of gypsite. The color of gypsum may be white, red, green, blue, gray, or brown. When gypsum is heated to a temperature of 120° to 130° C. about 14 per cent. of the water of crystallization is driven off and the product left has the composition of $(CaSO_4)_2 H_2O$; the mineral is then easily reduced to a powder, in which state it is known as plaster of Paris. Plaster of Paris when mixed again with water forms a hard mass, and this setting is due to the recrystallization of the calcium sulphate. If the gypsum is underburned its setting power is injured, and the same effect may be produced by over-calcining, for the reason that the latter so comminutes the gypsum particles that none are left to serve as nuclei around which the crystals can begin to form when the setting takes place. Fine grinding does not have any effect on the setting power. Underburned gypsum is tough and soluble in cold water to the extent of about one part in 461, and it is scarcely more soluble in acids or warm water.

ORIGIN AND DISTRIBUTION. The origin of gypsum may be explained in several ways. Some beds of the material have been formed by the changes of existing deposits by chemical reactions, as when sulphuric acid liberated by the decomposition of pyrite attacks carbonate of lime, and converts it into calcium sulphate. In such cases there may be a gradual passage from the limestone into the gypsum rock. Gypsum may also be formed by the evaporation and concentration of sea-water; and in fact most deposits of gypsum found in the world are considered to have been derived in this manner, although the gypsum is not deposited until about 80 per cent. of the salt water has been evaporated. Gypsum is widely distributed geologically, being found in various formations, ranging from the Silurian up to the Tertiary. Extensive beds of gypsum are found in the Silurian formation in New York, the Carboniferous of Ohio and Michigan, and the Cretaceous of Iowa and Kansas. Deposits also occur in Arizona, California, Colorado, Wyoming, Indian Territory, Texas, Utah, and Virginia. In foreign countries it is found in Canada, Germany, Norway, France, Austria, Bohemia, Italy, Egypt, Arabia, and Persia. It is mined sometimes by quarry methods and sometimes by underground workings.

USES. The use of gypsum seems to have been known at a very early period, for the Greeks were familiar with it, as shown by the writings of Theophrastus and Pliny. The commercial value of the mineral gypsum depends largely on the color, the whiter grades being calcined and used for plaster. This calcining is commonly done in large kettles, the material having been previously ground in crushers and mills. The kettles are usually about six feet deep and eight feet in diameter, and are filled to a depth of five feet. They are heated from below, and the gypsum is constantly stirred during the calcining process by revolving arms. Aside from its uses for ordinary plastering, it is also extensively employed in the manufacture of ornamental stucco work, as a filler in paper, in making imitations of marble, and sometimes for calcimining. Where a slow set is desired a retarder is sometimes used, such as glue, hair, lime, etc. Raw gypsum is also used as a basis for paints, the pigments being mixed with it. The impure crude gypsum finds application only for fertilizing purposes, and is extensively employed in both England and America for increasing the fertility of soils.

(See MANURES AND MANURING.) It is also employed at times to counteract the black alkali which forms in many of the soils of the arid region. Alabaster has been used for many years for decorative purposes, and in the making of statuary, while satin spar has been employed for necklaces, inlaid work, and other ornaments.

The total quantity of gypsum produced in the United States in 1901 amounted to 1,246,649 short tons, valued at $1,577,493, and of this quantity 521,292 short tons were calcined. In the United States Kansas is the largest producer, with Michigan second. The imports in 1901 were valued at $326,670. Among the world's producers France leads, with the United States second and Canada third.

BIBLIOGRAPHY. Grimsley and Bailey, *Gypsum Deposits of Kansas*, issued by Kansas Geological Survey (Topeka, 1899); Wilkinson, "Technology of Cement Plaster," *Transactions of the American Institute of Mining Engineers* (New York, 1897); La Croix, "Le gypse de Paris et les mineraux qui l'accompagnent," *Nouvelles archives des museum histoire naturelle* (Paris, 1897). For statistics, consult volumes of the *Mineral Resources*, issued by the United States Geological Survey (Washington, annual). See PLASTER OF PARIS.

GYPSY MOTH. This insect is abundant throughout the temperate zone in the Old World, and often does much damage to fruit, shade, and forest trees, particularly in France, Germany, and Southern Russia. It was first described by Linnæus in 1758, and named by him *Bombyx dispar*, but later authorities place it in the genus Porthetria. The eggs of the moth are laid in August in a yellow, hairy mass on tree-trunks, rocks, and fences. They hatch the following spring, and the caterpillars feed on all kinds of trees, shrubs, and plants. Even conifers are not exempt from their ravages, and the latter trees usually die after one defoliation. By the middle of July the caterpillars become full grown, when they pupate in loose cocoons in sheltered places, and the moths emerge in about two weeks' time. The male moth is brown, and flies actively, while the large white female does not fly.

This insect was introduced into Medford, Mass., by Leopold Trouvelot, who in 1869 was experimenting with various American and European silkworms in the effort to find some hybrid which might be exempt from the attacks of the pébrine disease of silkworms. Trouvelot's specimens escaped accidentally, and although he notified the proper authorities, the matter was lost sight of until about 1889, when the ravages of the caterpillars at Medford were sufficient to cause general alarm. A year or two of desultory efforts on the part of property-owners in this vicinity were sufficient to convince them that they could not successfully cope with the insect, and the aid of the State was asked. In 1890 the Legislature of Massachusetts began the effort to exterminate the moth, first placing the work in the hands of a commission, and later transferring it to the State Board of Agriculture. This work was carried on systematically for about ten years, at an aggregate expense to the State of nearly $1,000,000, when it was permitted to lapse, chiefly because public sentiment in Massachusetts would not support it further. The insect having become scarce, it was difficult to convince taxpayers of the necessity of further appropriations to secure the last remaining ones. Since the abandonment of the work by the Legislature in 1900, the moth has gradually increased to a point where several municipalities have been obliged to take up the work of destroying it, using the methods originated and perfected by the Board of Agriculture. Unless thorough work can be prosecuted over the entire district, it is quite probable that in a few years damage by the moth will become much more severe than ever before. Consult: Forbush and Fernald, "The Gypsy Moth," *Massachusetts State Board of Agriculture* (Boston, 1896); Howard, "The Gypsy Moth in America," *Bulletin 11, United States Department of Agriculture* (Washington, 1898).

GYPSY MUSIC. See MAGYAR MUSIC.

GYRATION, CENTRE OF. See CENTRE OF GYRATION.

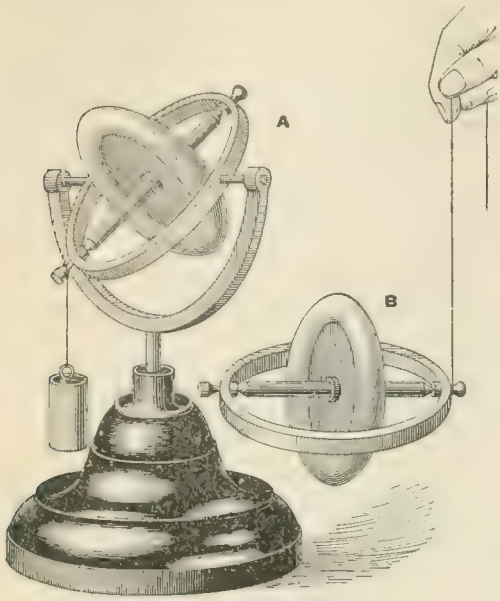
GYRFALCON (OF. *gerfaucon, girfaucun, gerfault*, Sp. *gerifalte, gerifalco*, from ML. *hierofalco*, gyrfalcon, from Gk. ἱερός, *hieros*, sacred; popularly connected with ἱέραξ, *hierax*, falcon, although the words are only remotely akin, + Lat. *falco*, falcon, confounded in popular etymology with Lat. *gyrus*, circle, in fancied allusion to the bird's circling flight). A large falcon (*Falco rusticolus*, or *Falco Islandicus*), the female of which is about two feet in entire length. The plumage is almost brown when the bird is young, but gradually changes to white as it advances in age, the white margin of each feather encroaching on its brown centre, until aged birds are almost pure white. It is rarely seen in the United States or other temperate regions, except in severe winters, but inhabits all the very cold northern parts of the world. It was formerly in high esteem for falconry, and was procured at great expense from Iceland and Norway. Two species and two subspecies are recognized in America. See Plate of FALCONS AND FALCONRY.

GY'ROMAN'CY. See SUPERSTITION.

GYRON'NY. See HERALDRY.

GY'ROSCOPE (from Gk. γῦρος, *gyros*, circle + σκοπεῖν, *skopein*, to view). The name given by Foucault to an instrument for the exhibition of various properties of rotation, and the composition of rotations first described by Bohnenberger in 1817. It differs from a top in having both ends of its axis supported. The invention is probably French or German, and in some of its forms it dates from about the end of the eighteenth century, but no certain information can be obtained as to the original inventor. Its action is based on the principle that if a mass is set in rotation about its principal axis of inertia of greatest or least moment, it will continue to revolve about it, and unless extraneous force is applied the direction of the axis will remain unchanged. If, then, a mass of metal—as, for instance, a circular disk, loaded at the rim and revolving in its own plane—be made to rotate rapidly about its axis of greatest moment of inertia, and if it be freely supported (in gimbals, like the box of a compass), the direction of its axis will be the same so long as the rotation lasts. It will, therefore, constantly point to the same star, and may be employed to show that the apparent rotation of the stars about the earth is due to a real rotation of the earth itself in

the opposite direction. This application was made by Foucault in 1852, who set his gyroscope in rotation, and then with a telescope observed the apparent change in the plane of its rotation caused by the movement of the earth.



GYROSCOPE.

The most singular phenomena shown by the gyroscope are those depending on the composition of rotations. Any motion of a body which has one point fixed is of the nature of a rotation about an axis passing through that point. Hence, simultaneous rotations about any two or more axes, being a motion of some kind, are equivalent to a rotation about a single axis. The effect, then, of impressing upon the frame in which the axis of the gyroscope is suspended a tendency to rotate about some axis, is to give the whole instrument a rotation about an intermediate axis; and this will coincide more nearly with that of the gyroscope itself, the greater the rate of its rotation. It is hardly possible to explain to the non-mathematical reader the exact nature of the compound motion, but the rotation of the axis of a top round the vertical (when it is not 'sleeping' in an upright position), and the precession of the earth's axis, are precisely similar phenomena. Thus, when the gyroscope is spinning, its axis being horizontal, a weight attached to the framework at one end of the axis (Fig. A) makes the whole rotate about the vertical. Often the apparatus is so arranged that the framework may be lifted by a string attached near one end of the axis (Fig. B), and the gyroscope will then revolve without falling. Its axis still projects horizontally from the string, but it revolves as a whole round the string. Various other singular experiments may be made with this apparatus; and others, even more curious, with the gyrostat of W. Thomson (q.v.), which is simply a gyroscope inclosed in a rigid case, by which the ends of its axis are supported. When a gyrostat is made the bob of a pendulum under certain conditions, the plane of vibration of the pendulum turns, as in Foucault's celebrated experiment, but in general at a much greater rate.

The gyroscope is thoroughly discussed in a treatise by Gen. J. G. Barnard, published in 1858, and in the following standard works on physics: Wüllner, *Lehrbuch der Experimentalphysik* (5th ed., Leipzig, 1894-95); Müller-Pouillet Pfaundler, *Lehrbuch der Physik* (9th ed., Brunswick, 1886); and also in Poggendorff, *Annalen*, vol. xc. (Leipzig, 1878).

GY'ROSCOP'IC PENDULUM. See MECHANICS.

GYROS'TEUS. See CHONDROSTEUS; STURGEON.

GYROWETZ, gē'rō-vĕts, ADALBERT (1763-1850). An Austrian composer. He was born at Budweis, Bohemia, and after studying law at Prague, devoted himself entirely to music. Introduced to the Vienna public through the influence of Mozart, his first symphonies were received with marked favor, and he was soon enabled to continue his studies at Naples, Milan, and Paris. He afterwards became a favorite of the Prince of Wales at London, and upon his return to Vienna was appointed conductor of the Imperial orchestra. In that capacity he directed the opera from 1804 to 1831. He was a very prolific composer, writing over 60 symphonies, 40 ballets, and 30 operas, the most popular of the latter being *Agnes Sorel* (1811) and *Der Augenarzt* (1811). His autobiography was published in 1848.

GYTHIUM, jĭth'ĭ-ŭm (Lat., from Gk. Γύθιον). A town in the Peloponnesus, on the Laconian Gulf, near the modern Marathonisi. It lay opposite the island of Cranæ, and was the port of Sparta, 27 miles distant. The harbor was an artificial one, and protected by a breakwater. Its inhabitants claimed Apollo and Heracles as the founders, but it seems to have been originally a settlement of Phœnicians, attracted by the presence of the murex, which yielded the Phœnician red dye. It was the ordinary station of the Spartan fleet, and in the wars against Athens it was therefore exposed to frequent attacks. Tolmides, the Athenian commander, burned it, B.C. 455. Later it was besieged unsuccessfully by Epaminondas, B.C. 370. It was strongly fortified by the tyrant Nabis; but he was compelled by Flamininus to give up Gythium and other coast towns to the Achæan League, B.C. 195. It afterwards became a member of the league of independent Laconian towns, which after the time of Augustus received the name of the Free Laconians. Excavations in 1891 uncovered part of the theatre and of other ancient structures, and there are numerous ruins of Roman times in the neighborhood. A considerable part of the ancient city seems to be covered by the sea, as extensive ruins can be seen in the bay on a calm day. The site is described by Leake, Le Bas, Ross, Curtius, Philippson, and others in their books on the Peloponnesus, and a good plan is given in Le Bas, *Voyage archéologique, Itinéraire* (Paris, 1888). The excavations are described in the Πρακτικά of the Greek Archæological Society (Athens, 1891).

GYULA, dyōō'lŏ, or **BÉKÉS-GYULA,** bā'kāsh dyōō'lŏ. Capital of the county of Békés, Hungary, situated on the White Körös, in a somewhat swampy district, 45 miles southwest of Grosswardein (Map: Hungary, G 3). It has

manufactures of wine, oil, and spirits; turtle-fishing; and a considerable trade in cattle. Population, in 1890, 19,991; in 1900, 22,023.

GYULAI, dyōō'lōī, Franz, Count von Maros-Németh and Nadaska (1798-1868). An Austrian soldier, born at Pest. In 1814 he entered the Austrian Army, and by 1846 had risen to the rank of major-general commanding a division. In that year also he was appointed commandant of Triest, in which post in 1848 he assembled the scattered vessels of the Austrian Navy, so far as possible, under his control, and after the outbreak of revolution assumed command of this naval force upon his own responsibility and maintained a coast defense. He became War Minister in 1849. In 1859 he received chief command of the Austrian Army in the Italian War, but after his defeat by the Franco-Sardinians at Magenta he retired from the service. Consult Rüstow, *Der italienische Krieg 1859, politisch-militärisch geschrieben* (Zurich, 1859).

GYULAI, Pál (1826—). An Hungarian poet and literary critic. He was born and educated at Klausenburg, and was appointed professor of Hungarian literature at Budapest in 1875. His works include a biography of Vörösmarty (2d ed. 1879); a critical work on Katona (2d ed. 1883); the collection of novels entitled *Vázlatok és képek* (Sketches and Pictures, 1867); and a volume of poems (1882).

GZOWSKI, gzhōv'skī, Sir Casimir Stanislaus (1813-98). A Polish-Canadian engineer, born in Saint Petersburg. He graduated at the military engineering college in Kremenetz, Volhynia, and had a commission in the regular army that he relinquished to join the patriots of Poland in their insurrection, for which he was imprisoned in Austria and banished, going to the United States in 1833. Having no knowledge of English, he could not follow his own profession there, so he taught French, German, drawing, and fencing; studied law in Pittsfield, Mass., and practiced it in Pennsylvania. In 1841 he repaired to Toronto, where he speedily found engineering occupation in connection with the proposed enlargement of the Welland Canal, and he received an appointment in the Public Works Department. He had charge of the harbor works at Montreal (1850-53), was chief engineer of the Saint Lawrence and Atlantic Railway Company, and in 1857-69 senior partner of a railroad-building firm which owned rolling-mills in Toronto. In 1871 he was engineer of the International Bridge across the Niagara River. He was knighted in 1891.

H

H The eighth letter and sixth consonant in the English alphabet. Its form is derived, through the intermediate Latin H, from the Chalcidian Greek H, and the Phœnician 𐤇. As this character was used in Greece for both an aspirate and a vowel sound, some differentiation of form was found to be necessary and accordingly ᚼ was used for *h*, and H for *ē*. The form ᚼ passed through the stage *L* to the symbol ', for the rough breathing. In like manner, ' came to stand for the smooth breathing. The Latin H and the Greek *ēta* (H) are identical in both form and alphabetic position, but they have not the same value. They have taken the position of *cheth*, the eighth letter in the Phœnician alphabet. The name *cheth* was probably merely a letter-name and not a word in the Semitic languages.

PHONETIC CHARACTER. The modern sound of *h* is a gradual weakening of an old strong guttural or back-palatal as in Ger. *lachen*, Scotch *loch*. In Old English, *h* was a guttural; later on it softened to a spirant, or often practically disappeared. Linguistically, the English *h* comes from: (1) Indo-Ger. *k* > Germanic *h*, as *hurdle*, OHG. *hurt*, Goth. *haurds*, Lat. *crates*, Gk. κάρταλος, Indo-Ger. *kert*, 'to bend, weave' (?); (2) Germanic *hv*, as *who*, Goth. *hvas*, Lat. *quis*, Indo-Ger. **qo;* (3) the combination *gh* in English orthography is usually a way of writing the Old English spirant, thus, *high*, OE. *hēah*, Ger. *hoch*. This *gh* sometimes shows labialization, as the sound of *f* as in *trough*, *slough;* or sometimes it is so attenuated through palatalization as practically to disappear, e.g. *mighty*. In *ch*, *th*, *ph*, *sh*, the *h* indicates a spirant pronunciation. The pronunciation of the *h* is one of the most difficult things in the English language. It depends partly on the following vowel and partly on accentuation. In French, the sound is disappearing, but it is being more used in England and America.

AS A SYMBOL. H in chemistry = hydrogen. As a numeral, H = 200, H̄ = 200,000. In Greek ϟ was used for 8; ϡ for 8000.

HAAG, häg, CARL (1820—). A German painter in water-color, long a resident of England. He was born at Erlangen, studied principally with Reindel in Nuremberg and at Munich. From the time of his removal to England in 1847, he devoted himself to water-color. He traveled much in the Orient, especially among the Bedouins, whose life he has portrayed with truthful vigor and brilliant color effects. He has obtained many medals and honors and is Court painter to the Duke of Saxe-Coburg and Gotha. Since his return to Germany he has lived in the famous Red Tower at Oberwesel on the Rhine, which he bought and restored.

HAAKON, hą'kôn, or **HA'KON**. The name of several Norwegian kings in the Middle Ages. The earliest of them, HAAKON THE GOOD, was sent to the Court of Athelstane in England, from which he returned with a fleet when the Norwegian throne was seized by his brother Eric, after the death of their father, Harald Haarfager (933). He defeated Eric, and ruled from about 934 to about 960. He was a Christian, and English missionaries under his protection did much to Christianize Norway.—HAAKON MAGNUSSON, a grandson of Harald Haardraade, was king for a short time, about 1093-95.—HAAKON HERDEBRED (1147-62), son of Sigurd, ruled for only five years (1157-62), a stormy period, full of revolt and strife.—HAAKON HAAKONSSON (1204-63), the elder, grandson of Sverre and son of the Haakon who ruled from 1202 to 1204, is best known for the addition of Greenland and Iceland to the Norwegian realm during his reign, which began when he was only thirteen and lasted for forty-six years.—HAAKON MAGNUSSON, the elder, succeeded his brother, Eric, on the throne in 1299 and reigned to 1319.—Another HAAKON MAGNUSSON, called the younger, was son of Magnus Eriksson, King of Sweden and Norway, who was forced to resign the crown to Haakon in 1343, when the latter was still a child, remaining regent during his minority. Haakon married Margaret (q.v.), daughter of Waldemar of Denmark. He died in 1380.

HAANEN, hä'nən, REMI VAN (1812-94). A Dutch landscape painter, born at Oosterhout, North Brabant. After studying with his father and Jan van Ravenszwang, he traveled throughout Europe, and from 1837 resided at Vienna. He painted moonlight and water scenes with some technical ability, but, with increasing popularity, his work became mannered. He is well represented at Berlin and Prague. His brother GEORG GILLIS (1807-79), also pupil of his father, and a wide traveler, painted similar subjects. Vienna and Leipzig possess good examples.

HAAR, här, BERNARD TER (1806-80). A Dutch poet, born in Amsterdam. He obtained his degree in theology, held several pastorates, and in 1854 was made professor of theology in the Uni-

versity of Utrecht. From this position he retired in 1874. He wrote a number of theological articles, and *Wie was Jezus?* (1863), a volume directed against the teachings of Renan, for whom, and for whose followers, he had a great dislike. His other prose works include: *De Historiographie der Kerkgeschiedenis* (1870-73). The most remarkable of his poems are: *Johannis en Theagenes* (1856); *Huibert en Klaartje* (3d ed. 1858); and *De Sankt Paulus Rots* (5th ed. 1865); and those in the collections published in 1871, 1878, and 1879.

HAARLEM, här'lĕm. The capital of the Dutch Province of North Holland, situated on the Spaarne, 11 miles west of Amsterdam (Map: Netherlands, C 2). It is an extremely clean and well-built city, situated amid very picturesque environs intersected by canals, and full of interesting Dutch houses. The principal church is the Groote or Saint Bavo's Kerk, a fifteenth-century cruciform edifice, with a tower 260 feet high and an organ with 5000 pipes, 60 stops, and 3 keyboards—one of the largest instruments of its kind in the world. In front of the church is a statue of Coster, the alleged inventor of printing. In the Groote Markt is the meat market, a brick and stone building dating from the beginning of the seventeenth century, and considered to be of great architectural merit. The town hall, a former palace of the counts of Holland, remodeled in 1620, contains a small collection of paintings by Dutch artists, including eight large canvases by Frans Hals. In the same building are also the town library, and a collection of weapons, glasses, and instruments of torture associated with the early history of Haarlem. Among other interesting buildings may be mentioned the Pavilion, a château in Italian style, now the seat of the Society for the Promotion of Industry, and containing an industrial art and a colonial museum, the latter consisting of an extensive collection of the products of the Dutch colonies, notably those of the Dutch East Indies. The educational institutions of Haarlem include a gymnasium; a seminary for teachers; the Teyler Museum with its numerous scientific collections and an extensive library; the episcopal museum with a collection of Dutch ecclesiastical antiquities. There are also two theatres and the oldest printing house in Holland. The town contains numerous homes for the aged, known as *hozjes*. Although of less industrial importance than in former times, Haarlem still has a number of large industrial establishments, notably textile mills. One of the oldest and most extensive industries is the cultivation of flowers, Haarlem exporting bulbs to many European countries. There are a horse-car line for local purposes and an electric railway for interurban traffic. Population, in 1899, 64,069.

Haarlem grew up around a castle, and obtained municipal rights in 1245. It rapidly developed into an important city. In 1492 it was seized by the peasantry, and upon its being recovered by the Imperial Statholder, Duke Albert of Saxony, it was deprived of its privileges and burdened with heavy taxes. In 1559 it became the seat of a bishop. Haarlem took a prominent part in the revolt of the Netherlands, and as a result was besieged in 1572 by an army of 30,000 men under Don Frederico, a son of the Duke of Alva, and after an heroic resistance of seven months capitulated to the Spaniards, who, regardless of their promise of mercy, avenged themselves on the city and its inhabitants in the most cruel way. In 1577 it was freed from the rule of Spain by the Prince of Orange, and became a part of the Netherlands.

HAARLEM LAKE. A district in the Dutch provinces of North and South Holland, formerly a lake. It lies between Haarlem, Amsterdam, and Leyden (Map: Netherlands, C 2). It was formed from four small ponds by an inundation of the sea at the end of the sixteenth century. At one time its area was 60,000 acres. In consequence of the destructive overflow of 1836, the Government decided to drain the lake. The work was begun in 1840 and completed in 1853. The land reclaimed forms at present an island of 70 square miles, with a fertile soil and a population of about 16,000.

HAAS, häs, JOHANNES HUBERTUS LEONARDUS DE (1832—). A Dutch painter, born at Hedel, North Brabant. He studied under Van Os, in Haarlem, and afterwards lived in Brussels. His works consist of characteristic Dutch landscapes with animals, or of studies of animals alone, and are of a high order. They include "After the Flood" (gold medal, Utrecht, 1861); "A Trio of Donkeys" (gold medal, Munich, 1869); "Cows at Pasture" (National Gallery, Berlin); "Pasture on the Banks of the Yssel;" "Noonday Rest on the North Sea;" "Three Comrades;" and "Castle on the Rhine." He also engraved several of his own pictures.

HAASE, hä'zĕ, FRIEDRICH (1826—). A distinguished German actor. He was born in Berlin, the son of the first valet de chambre of Frederick William IV., under whose patronage he received a thorough education and was prepared for the stage by Ludwig Tieck. In 1846 he made his début at Weimar, acted there until 1848, then in Potsdam and Berlin, and rose to prominence during his connection with the theatre in Prague in 1849-51. His subsequent performances at Karlsruhe, Munich, and in 1855-58 at Frankfort, steadily increased his reputation, while starring tours made his name familiar in various countries of Europe, and an engagement at Saint Petersburg during the six winters from 1860 to 1866 firmly established his position in the front rank of German actors. In 1869 he visited America; then was for one year a member of the Court Theatre in Berlin, and in 1870 succeeded Laube as director of the Stadttheater in Leipzig, and managed it cleverly to great pecuniary advantage for six years. Henceforth he made his home in Berlin, and undertook only starring engagements, the most important of which was his tour through the United States, as far as California, in 1882-83. His distinguished appearance made him an apt impersonator of the aristocratic types in high comedy which belong to the most brilliant parts of his repertory, presented with original conception, exquisite refinement, and ingenious elaboration of character. Chief among these were Count Thorane, in Gutzkow's *Königsleutnant*, Klingsberg the elder in *Die beiden Klingsberg*, Chevalier Rocheferrier in *Eine Partie Piquet*, and similar rôles. Consult Simon, *Friedrich Haase: Eine dramaturgische Studie* (Berlin, 1898).

HAASE, Heinrich Gottlob Friedrich Christian (1808-67). A German classical philologist, born at Magdeburg, Prussia. After studying at Halle, Greifswald, and Berlin, he made extensive researches in the libraries of Paris, Heidelberg, Strassburg, and Bern, in the Greek and Roman military writers. He was made professor of philology at the University of Breslau in 1840, and in 1851 became co-director of the Philological Seminary at the same institution, where he remained until his death. His most important publications are editions of Xenophon, *De Republica Lacedæmoniorum* (1833); Thucydides, with a Latin translation (1840); Vellejus Paterculus, *Historia Romana* (1851 and 1858); Seneca (1852-53); and Tacitus, with admirable prolegomena (1855). Mention should be made of his article "Philologie," in Ersch and Gruber's *Allgemeine Encyklopadie*, and his *Die athenische Stammverfassung* (1857). His *Vorlesungen über lateinische Sprachwissenschaft* (1874-80) was edited after his death by A. Eckstein and Hermann Peter, and greatly stimulated research in the field of Latin philology. Consult: Bursian, *Geschichte der klassischen Philologie in Deutschland* (Munich, 1883), and Fickert, *Friderici Haasii Memoria* (Breslau, 1868).

HAAST, Sir John Francis Julius (known in Germany as Julius von Haast) (1822-87). An English colonial geologist and explorer, born at Bonn, Germany. His scientific training was obtained through study at the University of Bonn and extended Continental travel. In 1858 he went to New Zealand, where in the following year he was appointed by the Provincial Government to conduct explorations of Nelson, and prepare reports on the natural history and geology of the region. During the execution of this task he discovered fields of coal and gold. He became Governor-General of Canterbury Province in 1861, and as such he directed a ten years' exploration of the interior of the island. His topographical and geological maps won for him the gold medal of the Royal Geographical Society. He also discovered the remains of the gigantic extinct birds *Dinornis* and *Palapteryx*. As an authority on glaciation he was well known in scientific circles. He was elected (1867) to a fellowship in the Royal Society, and published *Geology of the Provinces of Canterbury and Westland* (1879).

HABAK'KUK. The eighth of the minor prophets. Concerning his life absolutely nothing is known. Legends about Habakkuk are plentiful in the later Apocryphal literature. In *Bel and the Dragon* (q.v.), for example, Habakkuk is ordered to bring food to Daniel in the lion's den, and in order to carry out this command, an angel seizes Habakkuk by the hair and transports him to Babylon. The etymology of the strange name, which has not a Hebrew sound, is unknown.

The Book of Habakkuk consists of two parts: (1) Chapters i. and ii., which deal with the threatened Chaldean invasion of Judea. The book opens with a dialogue between the prophet and God. The prophet complains of the prevalence of iniquity and violence among the Jews. God replies, threatening to punish them by allowing the Chaldeans to come against them. The prophet then humbly expostulates with God for using, as an instrument in punishing the Jews, a nation more guilty than themselves. God again replies, intimating that the pride of the Chaldeans will lead to their downfall, and promising aid to the righteous. The destruction of the Babylonian Empire is foretold with attending judgments on the Chaldeans for their covetous exaltation of themselves on the ruin of others; their murderous violence in building up their cities; their enticement of men to drunkenness as a means for effecting their fall; and their extension of idolatrous worship. (2) Chapter iii., called the prayer of Habakkuk, but in reality a sublime lyric ode, expressive of confidence that God will execute vengeance on His people's enemies. It opens with a prayer that God will give increased energy to His promised work of mercy reaching through the ages. God is praised for His interposition in behalf of His people in Egypt, at the Red Sea, and in the promised land. Confidence is expressed that, in times of utmost want and peril, He will give triumphant deliverance. Internal evidence enables us to fix the date of the book at the time when the Neo-Babylonian Empire founded by the Chaldean Nabopolassar c.625 B.C. had assumed a commanding position, and was already threatening to engulf Judea (cf. i. 6). Since the Chaldeans actually began to invade Palestine c.601 B.C., we are thus brought to the end of the seventh century as the approximate date for the first two chapters. Whether the third chapter, so totally different in character, belonged to the book originally is an open question, and the general trend of scholarly opinion is to regard it as an independent poem of uncertain date, which has been attached to chaps. i. and ii. because it seemed to accord with the subject treated in the latter. Consult the commentaries on the Minor Prophets (q.v.); Delitzsch, *De Habakkuk Prophetæ Vita atque Ætate* (Leipzig, 1842); id., *Der Prophet Habakkuk ausgelegt* (ib., 1843); for chapter iii., see Cheyne, on the Psalter (Bampton Lectures, London, 1888).

HAB'BERTON, John (1842—). An American editor and miscellaneous writer, born in Brooklyn. He was educated in southern Illinois, then learned the printing trade in New York; served in the Civil War, and did editorial work for the *Christian Union*, *Godey's Magazine*, and the New York *Herald*. He became well known through *Helen's Babies* (1876), widely circulated in America, England, France, and Germany, a slight but amusing account of childish precocity. Among his other works may be mentioned: *The Barton Experiment* (1877); *Other People's Children* (1877); a drama, *Deacon Cranket; The Chautauquans* (1891); *All He Knew* (republished 1900); and *The Tiger and the Insect* (1902).

HA'BEAS COR'PUS. Any one of several common-law writs which issue out of a court of justice, or (in England) are awarded by a judge in vacation, and require the body of a person to be brought before the judge or into the court for some purpose specified in the writ. The name arises from the emphatic words *habeas corpus* ('have the body') which occur in the writs so called. In the broadest inclusion, besides the writs now commonly so called, the writ known as capias (q.v.) is covered by the term *habeas cor-*

pus, and these words form a part of the Latin form of the writ. Of all these writs the one which is now of primary importance, and which is commonly meant by the term, is that of which the fuller name is *habeas corpus ad subjiciendum*, the history and law concerning which is here briefly stated under that fuller name. Other writs of minor importance are given below under their fuller names, by which they are ordinarily distinguished.

HABEAS CORPUS AD SUBJICIENDUM. This is a prerogative writ requiring the body of a person alleged to be unlawfully restrained of liberty to be brought before the judge or into court, that the lawfulness of the restraint may be investigated and determined. The writ is addressed to the person in whose custody the detained person is alleged to be, and commands him to produce the body of the prisoner before the court and there state the cause and warrant for his detention, or show cause why this was not done.

At the time when the Magna Charta declared that no "freeman may be taken or imprisoned but by the lawful judgment of his peers or by the law of the land," there seems to have been no definite machinery available by which a freeman so imprisoned could recover his freedom. This was due partly to the fact that the power was not then fully centralized, partly to the fact that the King's court (through which this was then to be accomplished if at all) was not yet ready to set at naught the King's will, and partly that the law seemed to fear too little rather than too much imprisonment of malefactors, and the action for false imprisonment seemed a sufficient check for merely lawless confinement. The words '*habeas corpus*' are making their way into various writs, but they are not yet habitually used of any method of investigating the cause or legality of an imprisonment.

A person arrested was set free as soon as some sureties became bound for his appearance in court. It was not common to keep men in prison, not (apparently) because of any love of the abstract idea of liberty, but because imprisonment was costly and troublesome to the sheriff. The sheriff enjoyed a discretionary power of detaining or releasing prisoners upon sureties such as he considered sufficient, except that he might not set at liberty any one imprisoned by the special command of the King. A writ (*de homine replegiando*), which came into currency during this same period, directed the sheriff to deliver the prisoner unless he were taken at the special command of the King or his chief justiciar or for the death of a man, or for some forest offense, or for some other cause which by law made him irrepleviable; but the writ was so worded as to throw upon the sheriff the responsibility of deciding whether the prisoner should be kept in custody.

In theory the central court (King's Court) had a control over the entire province of criminal justice, and at times directed a sheriff to send prisoners to Westminster for trial; but such instances at this date were rare, and were generally from Chancery rather than from the justices, and were more governmental than judicial in their origin. Undoubtedly, also, if a man thought himself unlawfully imprisoned by the sheriff or by some lord of a franchise, and made himself heard in the King's Court, the justices of that court had power to order that his body be brought before them, and to liberate him if persuaded that his imprisonment was unlawful.

Although in 1234 the royal court, by the mouth of William Raleigh, declared null and void the outlawry of Hubert de Burgh (q.v.), which the King had especially commanded, this victory of law over arbitrary power was gained only after a revolt and a change of Ministry. In spite of this, a man committed to jail by the 'mandate of the King' would have found none to liberate him. It was two hundred years before the habeas corpus as the appropriate instrument for enforcing the law of personal liberty granted by Magna Charta became well established, and it was not until the reign of Charles II. that the last vestige of the superiority of the King's mandate disappears. In Darnel's case (3 Charles I., 1627) the judges declared that a return to a writ of habeas corpus directed to the warden of the Fleet Prison, which set forth that the prisoner was detained by warrant of the Privy Council, was a sufficient answer to the writ. The result of the indignation consequent upon this subserviency of the judges to the King's will was the passage of the Petition of Right (16 Charles I., ch. 10, sec. 8), which provided that the writ of habeas corpus should be granted as of course to a person committed by the King or Privy Council upon demand made to the Court of King's Bench or Common Pleas, thus extending the power of granting the writ to the Common Pleas Court by statute. In 1676 the court refused to grant a writ upon such a motion in vacation, and this resulted in the passing of the Habeas Corpus Act. The substance of the act is that the sheriff or other person having a prisoner in his custody shall, when a writ of habeas corpus is directed to him, bring the body of his prisoner into court, within a time fixed, with the true cause of his detainer or imprisonment, unless the commitment was for treason or felony plainly expressed in the warrant; that the writ of habeas corpus should be granted in vacation time by the Lord Chancellor, the writ to be returnable immediately and the prisoner to be discharged on giving security for his appearance before the proper court, except in case of persons committed for treason or felony expressed in the warrant of commitment, persons convicted or suffering execution by legal process, and persons detained upon a legal process or for an offense not bailable upon a justice's warrant; that persons discharged on habeas corpus shall not be recommitted for the same offense except by the court having cognizance of the case; persons committed to prison for treason or felony if not indicted and tried in or before the second term or session after commitment should be discharged; and that no inhabitant of England (except convicted felons and those contracting to be transported) shall be sent as prisoners to Scotland, Ireland, Jersey, etc., or any place beyond the seas. Stringent penalties provided for a forfeit of £500 against a judge delaying the issue of the writ, costs and damages of not less than £500, besides the penalties of præmunire for illegal transportation beyond seas.

This act was gravely defective in restricting,

or not extending, the right to habeas corpus to cases other than those of persons arrested on criminal charges. This defect was not remedied until 1816, when an act (56 George III., ch. 100) was passed providing that the writ should be granted in other than criminal cases; that though the return might be good on the face of it, if the facts on which it was made appeared doubtful, the prisoner should be admitted to bail; and that the writ should run to harbors and roads on the coast, although not within any county. In 1861 it was decided that the writ ran throughout the British Empire, and the act 25 and 26 Vict., ch. 20, was passed restricting the jurisdiction so that the writ should not run from the English court into those colonies or dominions where the granting of the writ by a local court had been provided for.

In the United States the right to the benefit of the writ of habeas corpus was always claimed by the English colonies in America, and was enjoyed by them except in cases of arbitrary oppression. An instance of its early use occurs in New York in 1707, in procuring the release of ministers arrested by an illegal warrant issued by the Governor, Cornbury. In New Jersey in 1710 the Legislature denounced a judge who had violated the 'undoubted right' of a colonist by refusing the writ to him. In 1692 the South Carolina Assembly adopted the act 31 Charles II., and during the reign of Anne the act was expressly extended to Virginia. Maryland in 1725 claimed the benefit of the writ as a "birthright of the inhabitants," independently of the royal favor. But, although the colonial charters generally contained express provisions that the colonists should have all the privileges and immunities of natural-born British subjects, no express mention seems to have been made in them of this particular writ. It was rather taken for granted as belonging of right to every British subject, and when the colonies separated from the mother country, the right of habeas corpus became a part of the general common law of the States, derived by them from the laws existing while they were still colonies. (See COMMON LAW.) The Constitution (Art. 1, sec. 9, subdiv. 2) provides that "the privileges of the writ of habeas corpus shall not be suspended unless when, in cases of rebellion or invasion, the public safety may require it." The constitutions of most of the States contain provisions of a similar effect; and in Virginia, Vermont, Louisiana, and North Carolina the suspension of the writ in any case is forbidden. The Constitution of Maryland, however, does not mention the writ. Several of the States provide in their constitutions for suspensions, as in Massachusetts for twelve months, New Hampshire three months, Florida in case of insurrection or rebellion, etc.

President Lincoln suspended the privilege of the writ in 1861 by proclamation, but it was decided by Chief Justice Taney, in the Circuit Court of Maryland, that Congress alone possessed the right to suspend the writ; and this seems to be the better opinion, although the right of the President was supported by authorities at the time. Later, in March, 1863, Congress passed a bill authorizing the President to suspend the privilege of the writ; but in cases arising under the exercise of this authority it was held that the suspension of the privilege did not suspend the issuance of the writ, but that the return was to be the means of suspending its further operation. Neither does the suspension of the privilege of the writ deprive an unlawfully arrested or imprisoned person of his action of damages, nor protect the wrong-doer from criminal prosecution. None of the States have suspended the privileges of the writ except Massachusetts, where the privilege of the writ was suspended from November, 1786, to July, 1787, on the occasion of Shays's Rebellion. In England, as noted above, the King's Court, or Court of King's Bench, and the Court of Chancery were the ordinary courts from which this writ was issuable; but it could be issued by the Court of Common Pleas and by the Court of Exchequer, at least in case of persons privileged in those courts. The Habeas Corpus Act (31 Charles II., ch. 2) and other later acts prescribed the courts which could issue the writ, extending the jurisdiction so that it is always possible to obtain the writ in vacation as well as in term time.

In the United States the power of the Federal courts is purely statutory in origin. The original statute creating this power in them was the Judiciary Act of September 24, 1789, sec. 14 (1 Stat., L. 81), which provided "that writs of habeas corpus shall in no case extend to prisoners in gaol, unless they are in custody under or by color of the authority of the United States, or are committed for trial before some court of the same, or are necessary to be brought into court to testify." The jurisdiction created by this act, it is now settled, is exclusive in the Federal court. Subsequent statutes have extended this jurisdiction to cases where the prisoner is in custody for an act done or omitted, in pursuance of a law or process of the United States (Rev. Stat., sec. 753), this being the general effect of the act of March 2, 1833 (4 Stat. at L., 634), commonly called the Force Bill; to cases where the prisoner is held in violation of the Constitution, or a statute, or treaty of the United States, whether in a State or Federal court (Rev. Stat., sec. 753); "to all cases of any prisoner in jail or confinement who are subjects of a foreign State, and domiciled therein, who are confined or in custody under or by any authority or law, or process founded thereon, of the United States, or of any of them, for or on account of any act done or omitted under any alleged right, title, or authority, privilege, protection, or exemption set up or claimed under the commission or order or sanction of any foreign State or sovereignty, the validity and effect whereof depends upon the law of nations, or under color thereof" (act of August 29, 1842, 5 Stat. at L., 539; Rev. Stat., sec. 753).

These provisions do not grant to the Federal courts the authority by habeas corpus to discharge a prisoner from the custody of the State courts or officers where the prisoner is within the jurisdiction of the State authority by which he is imprisoned, merely because rights are involved which arise under the laws of the United States, since where there is a proper jurisdiction the State courts are equally bound with those of the Federal Government, and are equally supposed, to support and give effect to the Federal laws, and any erroneous ruling in this respect would involve an error of law, which could be remedied

by a proper appeal to the Federal courts. But where the denial of right by the State court involves not only an error of law, but such a refusal as places the court in a position of acting without jurisdiction, as in acting under an unconstitutional State law, a basis is laid for the remedy of a habeas corpus from the Federal court. This power of the Federal courts to grant the writ under the special grounds mentioned above is discretionary, and the writ is frequently refused in cases where the granting of it would tend to subvert the ordinary course of justice in the State courts.

The general function and purpose of the writ is to determine whether the person in whose behalf the writ is granted is detained or held in custody lawfully or unlawfully. The cases where the writ is used may be broadly classified as those where the person is detained without any legal process, and where he is held under some form of legal proceedings, which may or may not be lawful. The first of these classes is exemplified where one parent seeks to obtain the custody of a child under the control and in the custody of the other parent or some other person, and for that purpose obtains a writ in behalf of the child, setting up the illegal confinement of the child. Here the merits of the whole case must be heard and determined in order to decide to whom the custody of the child lawfully belongs. So, in the case of a person confined as an insane person, without legal process, the merits of the case must be heard and decided, both as to whether the person is insane, and if so whether the confinement is lawful. Where the confinement is under legal process, however, the purpose and function of the writ is to procure a hearing and determination as to the question whether the confining authority is lawfully exercising its jurisdiction or not. Mere irregularity does not necessarily deprive the court of jurisdiction; but when the irregularity is so material that no jurisdiction over the prisoner has been obtained for the purpose of confinement, then the prisoner will be discharged. In other words, generally speaking, the writ cannot be used to do away with the regular trial of an action, or to inquire into the merits of proceedings any further than this is necessary to determine the legality of the confinement complained of.

The procedure by which the writ is obtained, both at common law and under the various statutes regulating the subjects in some of the States, is by some form of a petition or motion signed by the party or some one in his behalf, setting up such facts as are necessary to make out a *prima facie* case. The person entitled to custody of one illegally detained by another, as a father deprived of his child, may himself apply for the writ. The courts of the Federal Government in the United States have the discretionary right to withhold it; but in some of the States the writ must be granted, as in England, upon a proper petition or motion.

The question as to when the Federal and when the State courts have authority in cases where their authorities clash with each other is determined by the general principles governing the conflict of laws between the two. For a discussion of that subject, and of the method of return of the writ, the general principles of jurisdiction, etc., see the titles CONFLICT OF LAWS; CONSTITUTIONAL LAW; WRIT; JURISDICTION, etc.

HABEAS CORPUS AD FACIENDUM ET RECIPIENDUM. A writ by which a superior court commands an inferior court to produce the body of a defendant, together with the cause (whence the writ is also called a *habeas corpus cum causa*), or grounds of his being taken and held, there to do and receive whatsoever shall be adjudged of him in the superior court. The writ is sometimes used in the United States.

HABEAS CORPUS AD PROSEQUENDUM. A writ issued to remove a prisoner for trial in the jurisdiction where the act was committed.

HABEAS CORPUS AD RESPONDENDUM. A writ for bringing up a prisoner from a lower court to be charged with a new offense.

HABEAS CORPUS AD SATISFACIENDUM. A writ used to bring up a witness to a superior court to charge him with process of execution (q.v.) upon a judgment.

HABEAS CORPUS AD TESTIFICANDUM. A writ used to bring a witness into court when he is in custody at the time of the trial. It directs the sheriff to have his body in court. The power to issue writs of *habeas corpus ad testificandum* in cases where it is necessary to bring prisoners into court to testify is vested in the Federal courts by the General Judiciary Act of 1789.

Consult: Church, *Habeas Corpus, with Practice and Forms*, containing an extended account of its history in the United States (2d ed., San Francisco, 1893); Spelling, *A Treatise on Extraordinary Relief in Equity and Law;* the commentaries of Kent, Story, Blackstone, and Stephen; *Encyclopædia of the Laws of England* (London, 1897-98); Jenks, "The Story of the Habeas Corpus," 18 *Law Quarterly Review*, 64; and the authorities referred to under CONSTITUTION; CONSTITUTIONAL LAW; CONFLICT OF LAWS; WRIT, etc.

HABEAS CORPUS ACT. The name commonly given to the act 31 Charles II., ch. 2 (1679), which greatly facilitated the granting and enforcing of the writ habeas corpus (q.v.). Similar statutes in some of the States are also called habeas corpus acts.

HABEN'DUM. A technical term in the common law of conveyancing, to describe the part of a grant, or deed of lands, which immediately follows the description of the premises conveyed. This was formerly written in Latin, *habendum et tenendum* (to have and to hold), whence the name of the clause. Though not essential to the validity of a conveyance, it is still commonly employed in the English form of the words. Its purpose is to qualify or define the estate granted, as "to have and to hold, to the said John Doe (the grantee), his heirs and assigns forever," whereby a fee simple is created; or "to the said John Doe and the heirs of his body," showing the estate granted to be a fee tail. Where the *habendum* is clearly repugnant to the 'granting part' of a deed, it will be rejected, but if it be consistent with the grant it will control it. See CONVEYANCE; DEED; GRANT.

HABENECK, äb'nĕk'. FRANÇOIS ANTOINE (1781-1849). A French violinist and conductor, born at Mézières. He entered the Conservatory in Paris (1801), where he studied under Baillot, and obtained the first violin prize (1804). Afterwards he was appointed first violin at the Opéra,

and he served as director (1806), and conductor of the orchestra from 1821 to 1824. For twenty years, beginning in 1806, he conducted the Société des Concerts du Conservatoire, and was made permanent conductor in 1828. These concerts attained a European celebrity, and by means of them he introduced Beethoven's symphonies into France. He composed two concertos, compositions for the violin, and several songs. Among his pupils were Alard and Léonard.

HABERL, hä'bĕrl, FRANZ XAVER (1840—). A Catholic clergyman and writer on music, born at Oberellenbach, Lower Bavaria. He was ordained to the priesthood in 1862, in which year he was also appointed conductor of music at the Cathedral of Passau, and musical director of the Catholic Seminary in that city. During the period 1867-70 he was organist of the Church of Santa Maria dell' Anima at Rome, and from 1871 to 1882 served in a similar capacity at Ratisbon. In 1875 he founded in that city the celebrated School for Church Music, which under his management became one of the leading institutions of its kind. In 1880 Haberl assumed the editorship of the periodical entitled *Musica Sacra*. He was also chief editor of the splendid edition of the works of Palestrina, published by Breitkopf and Härtel (Leipzig, 32 vols., completed in 1894). A Palestrina Society was established by him in 1879. The following are a few of his principal publications: *Magister Choralis* (1865; 10th ed. 1893; trans. into English, Spanish, French, and Italian); *Cäcilien-Kalendar* (1876-85; since 1886 published as *Kirchenmusikalisches Jahrbuch*); *Psalterium Vespertinum* (8th ed. 1901); *Bibliographischer und thematischer Musikkatalog des papstlichen Kapellarchivs im Vatikan zu Rom* (1888).

HABERLANDT, hä'bĕr-länt, GOTTLIEB (1854—). An Austrian botanist, born at Ungarisch-Altenburg, Hungary, and educated at Vienna and Tübingen. In 1884 he was appointed professor of botany at the university in Gratz, and in 1891 he made a scientific tour through Java. He is a follower of Schwendener. His publications, mainly on the physiology and biology of plants, include: *Die Schutzeinrichtungen in der Entwicklung der Keimpflanze* (1877); *Physiologische Pflanzenanatomie* (1884); and *Eine botanische Tropenreise* (1893).

HÄBERLIN, hä'bĕr-lēn, KARL FRIEDRICH (1756-1808). A German authority on constitutional law. He was born and educated at Helmstedt, and was professor of German constitutional law at Erlangen (1782-86) and Helmstedt (1786-1808). His fame rests chiefly on the works entitled *Handbuch des deutschen Staatsrechts* (2d ed. 1797) and *Das deutsche Staatsarchiv* (16 vols., 1796-1808), which contain valuable essays and treatises on constitutional and statistical affairs.

HABICHT, hä'bĭkt, LUDWIG (1830—). A German novelist, born at Sprottau. His principal novels include: *Der Stadtschreiber von Liegnitz* (2d ed. 1881); *Schein und Sein* (2d ed. 1878); *Er muss studieren* (1896); and *Widersprüche* (1899).

HABIETINEK, hä-bē'tĭ-nĕk, KARL (1830—). An Austrian statesman, born in Prague. He graduated at Prague University (German) in 1855, in 1858 was appointed lecturer in Austrian civil law at Vienna, from 1864 to 1868 was at Prague as professor of civil law and the law of trade and exchange, and from 1868 to 1871 occupied a similar chair at Vienna. In 1871 he was for a time Minister of Justice, in 1879 became a life member of the Upper House of the Reichsrat, and in 1881 vice-president of the Reichsgericht, a tribunal for the settlement of conflicts between the ordinary administrative courts and the special court for Government officials. He was vice-president of the Supreme Court of Justice and Cassation from 1881 to 1889, and in the latter year was appointed its first president.

HAB'INGTON, WILLIAM (1605-54). An English poet, born at Hindlip, Worcestershire, of Roman Catholic parentage. He was educated at Saint-Omer and Paris; but declined to become a Jesuit, and returned to England. He married Lucy Herbert, youngest daughter of Lord Powis, and retired to his ancestral estate. Habington addressed to his wife, under the name of Castara, a series of beautiful lyric poems, distinguished from similar contemporary work by their purity of tone. To the volume entitled *Castara* (1634), additions, including religious poems, were made in 1635 and 1640. Consult: Arber, *English Reprints* (London, 1870); and Ward, *English Poets*, vol. ii. (ib., 1880-83).

HABIT (from Lat. *habitus*, condition, from *habere*, to hold). In its most extended sense, a settling of any plastic material into determinate form. Since the organism at large, and the nervous system in particular, are characterized by nothing so much as by plasticity, more especially during the years of growth that precede maturity, it is clear that habit must play an important part in biology, as well as in the sciences of mind (psychology, ethics) that follow upon biology. Habit, in this technical sense, is common both to man and to the lower animals. It may be defined as 'a fixed tendency,' the result of repetition and association, "to think, feel, or act in a particular way under special circumstances" (Sully). Habit finds its principal importance in the sphere of voluntary action, where it presents two points of psychological interest. In the first place, it "simplifies the movements required to achieve a given result, makes them more accurate, and diminishes fatigue." In the second place, it "diminishes the conscious attention with which our acts are performed" (James). Physiologically regarded, habit thus implies that nervous functions are relegated by the higher to the lower (automatic) centres; the cortex is relieved of so many burdens, and is free for so many new combinations. Psychologically regarded, it implies the possibility of mental progress: what we have learned becomes a matter of course with us, unconsciously utilized when the right cue is given, so that we can drop, without fear of forgetting, the topic that we have been working upon, and proceed to new acquisitions upon the organized basis of previous effort.

It is important to distinguish accurately between 'habit,' 'custom,' 'usage,' and 'fashion.' Habit is the widest term; it "covers all and every form of voluntary action that we have made our own" (Wundt). Habit is therefore an individual rule of conduct. Usage is social habit: there are family usages, local usages, etc.; but we do not speak of an individual usage. Custom

is habit, by virtue of its regularity and uniformity; it is also usage, by virtue of its social or common character. But it is, further, normative in nature: it exercises a moral constraint; we may disobey it, as we may disregard the moral laws proper, but we do so at the risk of being considered 'eccentric,' if of nothing worse. Fashion is an individual habit which has acquired a temporary vogue.

HABIT IN ITS RELATIONS TO ECOLOGY AND EVOLUTION. The habits of animals play an important part in evolution. A study of the habits or mode of life peculiar to this or that animal, i.e. whether it has creeping, leaping, flying, burrowing, or mining habits, is receiving at this time much attention. The habits of an animal change with the environment. By competition a plastic form may be compelled to change its habits. A form adapted to living on land may be forced to change its habits, and become aquatic or adapted for flight. Thus the whales have evidently descended from some terrestrial ancestor which went on all fours, and birds have apparently sprung from some four-footed reptile. The initial cause of these transformations was a change in the conditions of life, together perhaps with competition. This led to change of habits, and this caused changes in the use or functions of this or that organ, this change being accompanied by changes in other parts of the body (correlation of parts). Hence it will be seen that the matter of habits and change of habits has direct bearings on the evolution of organisms.

The importance of habits was clearly perceived by Lamarck, and change of habits is one of the factors of organic evolution suggested by him. He asserted that "great changes in circumstances bring about in animals great changes in their needs, and such changes in their needs necessarily cause changes in their actions. Now, if the new needs become constant or very permanent, the animals then assume new habits, which are as durable as the needs which gave origin to them." Then he goes on to say that if new habits are formed "there will from this result the use of such a part by preference to that of another, and in certain cases the total lack of use of any part which has become useless." He again says: "Such is then the power of habits, which have a singular influence on the conformations of parts, and which give to the animals which have for a long time contracted certain of them faculties not found in other animals." Darwin also occasionally speaks of the effects of habits, both in domestic and in wild animals. At present much attention is being paid to a study of the habits of animals, since it affords data for the study of comparative psychology.

Consult: Wundt, *Ethics*, translated (New York, 1897); James, *Principles of Psychology* (New York, 1890), which gives ethical implications and pedagogical maxims; Carpenter, *Mental Physiology* (London, 1888); Huxley, *Lessons in Elementary Physiology* (New York, 1896); Sully, *Outlines of Psychology* (London, 1889). See ASSOCIATION OF IDEAS; CUSTOM; INSTINCT.

HABITUAL CRIMINAL. One whose habit of indulging in criminal acts has been established by previous convictions. In some of our States there are statutes fixing three convictions as the minimum number required to constitute one an habitual criminal or offender, and in the absence of legislative definition, this number is sufficient to make out a case of habitual or common criminality. In other States, one conviction of a felony or five convictions of a misdemeanor warrant a judgment of habitual criminality. It is the present view that an habitual offender against the criminal law ought to be punished more severely than a first transgressor. Accordingly, modern legislation provides a sliding scale of punishments for persons convicted of crime. For the first offense a mild penalty is imposed, while a heavier penalty is inflicted with each repetition of the same offense. (See SENTENCE.) In some States it is provided that the person of an habitual criminal shall be at all times subject to the supervision of every judicial magistrate of the county, and of the overseer of the part of the town where the criminal may be found, to the same extent that a minor is subject to the control of his parent or guardian. Consult: Bishop, *New Criminal Law* (Chicago, 1892); *Blackburn* v. *State*, 50 Ohio St., 428 (1893).

HABITUAL DRUNKARD. In ordinary language a drunkard is one who has the habit of getting drunk, and the term habitual drunkard is therefore tautological; but the term has a technical legal use in the sense, a person who has become so confirmed in this habit of getting drunk as to render him a proper subject of legal guardianship, analogous to that exercised over insane persons, under provisions of statutory law.

The law of the State of New York is typical of this class of legislation. Under it the proceedings for the appointment of a committee of a person as an habitual drunkard involves an inquest into his character and habits, as in the case of insane persons. The committee, when appointed, has charge, not only of the estate of the drunkard, but also, subject to control of the court, of his person, so that he can fix his residence and otherwise determine his method of living.

A finding of habitual drunkenness upon the inquest deprives the habitual drunkard of his capacity to bind himself by contracts, even when sober; but it does not class him with those persons of unsound mind who cannot make a valid will. See DRUNKENNESS, and consult the authorities there referred to.

HACHETTE, hȧ'shĕt', JEAN NICOLAS PIERRE (1769-1834). A French mathematician, born at Mézières (Ardennes). He studied at Charleville and at Rheims, and taught at Rocroy (1787), Mézières (1788-92), and at the Collège de Collioure (1793). On the founding of the Ecole Polytechnique in Paris, in 1794, he was given a subordinate position, and in 1797 was called to the chair of descriptive geometry in this institution. In 1810 he was nominated to a professorship in the university, but for political reasons the Government refused to confirm the nomination. His first election, in 1823, to the Academy of Sciences also failed of confirmation, although he was finally, in 1831, successful in securing a seat. Hachette was a prolific writer on mathematical topics, his memoirs appearing in the *Journal de l'Ecole Polytechnique*, in the *Correspondance de l'Ecole Polytechnique* (Paris, 1817, 3 vols., which he edited),

in *Crelle's Journal*, and in various other scientific publications. He also wrote a number of works, among which the following are the most prominent: *Traité élémentaire des machines* (1809; 2d ed. 1828); *Programme d'un cours de physique* (1809); *Éléments de géométrie à trois dimensions* (1817); *Traité de géométrie descriptive* (1822; 4th ed. 1828); *Histoire des machines à vapeur* (1830). For a list of the memoirs of Hachette, consult *The Catalogue of Scientific Papers of the Royal Society*, vol. iii. (London, 1869). For a biographical sketch, consult Arago, *Œuvres*, vol. iii. (Paris, 1855).

HACHETTE, JEANNE LAÎNÉ (c.1454-?). A French heroine. So little is known of her family that it is impossible to say whether she was the daughter of an officer named Fourquet by whom she was confided to the care of Dame Mathieu Laîné, or was in truth the child of the latter and her husband, a simple workman of Beauvais. In 1472, when she was about eighteen years old, Charles the Bold of Burgundy invaded France, and endeavored to take Beauvais by storm. As the town was garrisoned by but 300 men, the inhabitants, men and women, defended the walls, and succeeded in repelling the first assault of the Burgundians. The second assault, however, was more determined, and a standard-bearer had succeeded in reaching the top of the rampart when Jeanne struck him dead with a hatchet (hachette) and captured the banner. This so disheartened the assailants that they again withdrew, and as reënforcements soon after entered the city, Charles decided to raise the siege. King Louis XI. not only rewarded Jeanne by marrying her to the man of her choice and decreeing that they and their descendants should be free from the payment of all taxes, but excused the other citizens from the payment of the poll-tax, gave many privileges to the women of Beauvais, and instituted an annual procession to take place on the day of Saint Angadrême, the patroness of the city, in which the flag captured by Jeanne was carried by some woman of her family. In 1851 a statue was erected to her memory in the principal square of Beauvais.

HACHETTE, LOUIS CHRISTOPHE FRANÇOIS (1800-64). A French publisher, born at Rethel, in the Ardennes. He began to prepare himself to be a teacher, but having been dismissed, owing to his politics, in 1822, entered a school of jurisprudence. This he quitted in 1826 to become a publisher in Paris, with the avowed object of issuing books to improve pedagogics, and to elevate the general intelligence of the people. This aim he pursued throughout his life, and the numerous series of works that he published in every department of knowledge gave him not only a national but a world-wide reputation as a moral educator and as a disseminator of wholesome literature. Noteworthy among his publications are scientific and miscellaneous libraries, editions of various classics, dictionaries of modern languages, dictionaries of universal reference, and *Le Journal pour Tous*, a weekly periodical founded in 1855. He was the author of several pamphlets on the economic condition of the poor and their betterment, and was greatly interested in the establishment of coöperative friendly societies among the industrial classes. He was also one of the early promoters of international copyright.

HACHIOJI, hä'chī-ō'jī. A town of Japan, situated on the island of Nippon, 23 miles by rail from Tokio. It is an important centre of the silk industry. Population, in 1898, 23,203.

HACKBERRY (variant of *hagberry, hegberry*, from *hag*, AS. *haga*, Dutch *haag*, Ger. *Hag*, fence, coppice + *berry*), also called SUGAR-BERRY, NETTLE-TREE, HOOP-ASH, and HAGBERRY. A number of trees and shrubs which belong to the natural order Urticaceæ, the species of which are distributed throughout the Northern Hemisphere. The best-known species are *Celtis occidentalis* and *Celtis Mississippiensis* of the United States. The former ranges from Canada to Tennessee, and westward to the Pacific. It is a large tree, which attains a height of 120 feet or more, and three feet in diameter. In habit of growth the tree somewhat resembles the white elm, but the bark is rougher and the branches are nearer the horizontal. It is of rapid growth, and is well adapted to park and general planting. The wood is heavy, rather soft, and coarse-grained. The heart-wood is brown, the thick sap-wood yellow. It is adapted to about the same uses as the elm. The latter species, to which the name sugar-berry is more generally given, is a somewhat smaller tree of more southern range. *Celtis australis*, sometimes called lotus-tree, is a species common in the Mediterranean region, and found in India. It attains a height of 60 feet or more, but is not hardy in the north. Its wood is extensively used for furniture, carving, etc., and its drupe-like fruits are edible. *Celtis bungeana*, a North China species, with dark green glossy leaves, is a hardy tree in northern latitudes.

HACK'EE (in imitation of the cry of the animal). A name for the chipmunk (q.v.), found in the books of Richardson, Godman, Audubon, and other early writers, and perhaps once in popular use in the Southern States, but now rarely heard. The same may be said of 'chickaree,' a name given to the red squirrel (*Sciurus Hudsonius*), according to Audubon, on account of its chattering note.

HACK'ENSACK. A village and the county-seat of Bergen County, N. J., eight miles east by south of Paterson; on the Hackensack River, and on the New Jersey and New York and the New York, Susquehanna and Western railroads (Map: New Jersey, D 2). It is primarily a residential town, and has the Johnson Public Library, Hackensack Hospital, and an Old Ladies' Home. The principal industrial establishments are silk-mills, a jewelry factory, and a wall-paper factory. The government is vested in a board of commissioners, elected from the village wards for a term of three years. Hackensack was first settled by the Dutch, about 1640, near a village of the Hackensack Indians, and in 1678 a company of Huguenots settled near here on what was known as the French Patent. Washington stopped here on his retreat across New Jersey in 1776, and the place was subsequently occupied by the British and Hessians. Hackensack was incorporated in 1868. Population, in 1890, 6004; in 1900, 9443.

HACK'ER, FRANCIS (?-1660). An English regicide. He was a zealous supporter of Parliament and later of Cromwell during the Civil War and the Protectorate, and distinguished

himself in several battles. He commanded the soldiers who guarded Charles I. during his trial, had charge of the execution, and signed the executioner's order. During the Scotch War he commanded a regiment under Cromwell, and later represented Leicestershire in the Parliament of Richard Cromwell. After the Restoration he was sent to the Tower, and was hanged on October 19, 1660.

HACKERT, hä'kērt, PHILIPP (1737-1807). A German painter, born at Prenzlau, Brandenburg. He studied under his father, and at the Berlin Academy. While in Rome he painted his best works, "The Naval Battle at Tchesme and the Burning of the Turkish Fleet," a series of six pictures executed by order of Catharine II. of Russia. Ferdinand IV. of Naples made him Court painter (1786). After the Revolution of 1799 he bought a villa near Florence, where he lived until his death. He was one of the ablest of the eighteenth-century landscape artists, but has been overpraised. Among his works are: "A View of Saint Peter's," "Ideal Landscapes" (2), a number of views about Rome, and some marines. His four brothers were also painters—Karl Ludwig (?-1800); Johann Gottlieb (1744-73); Wilhelm (1748-80); and Georg Abraham (1755-1805).

HACK'ET, JOHN (1592-1670). An English ecclesiastic. He was educated at Trinity College, Cambridge, and was ordained in 1618. He remained loyal to the King during the Civil War, but was permitted to stay in England until the Restoration in 1660 placed the Stuarts again on the throne. The next year he became Bishop of Coventry and Lichfield. Among his publications are: *Loyola* (1648), a Latin comedy of small merit; and a *Life of Archbishop Williams* (1693). Consult Plume, *Life of Hacket*, reprinted with additions by Mackenzie Walcot, B.D. (London, 1865).

HACK'ETT, HORATIO BALCH (1808-75). An American biblical scholar, born in Salisbury, Mass. He graduated at Amherst in 1830, and studied theology at Andover, and in Germany. He was professor of Latin and Greek at Brown University, and in 1839 was chosen to the chair of biblical literature in the Newton Theological Seminary, where he remained for thirty years. In 1870 he was made professor of New Testament Greek in the Rochester Theological Seminary. He was one of the most distinguished biblical scholars in the Baptist Church, and a notable exegetist. His works include: An edition with notes of Plutarch's *De Sera Numinis Vindicta* (1844); *Illustrations of Scripture Suggested by a Tour Through the Holy Land* (1855); a translation of *Philemon* (1860); *Christian Memorials of the War* (1864); an edition of *Rawlinson's Historical Illustrations of the Old Testament* (1873); and other translations for the American edition of Lange's *Commentary*. With Ezra Abbott he edited the American edition of Smith's *Bible Dictionary* (1868-70). Consult Whittemore, *Memorials of Horatio Balch Hackett* (1878).

HACKETT, JAMES HENRY (1800-71). A noted American comedian. He was born and brought up in New York City. After his early marriage to an actress, Miss Lee Sugg, and a failure in business, he went upon the stage, first in 1826, and rapidly earned a prominent position, especially in eccentric characters. Among his impersonations best known were Justice Woodcock, Sylvester Daggerwood, Mons. Morbleu, Dromio, Rip Van Winkle, Nimrod Wildfire, Sir Pertinax McSycophant, and above all, Falstaff, in which in this country he had no peer. He played with success in England, and in all parts of the United States, besides managing, at different times, several theatres. Before his death he had made a fortune. He was the author of *Notes and Comments on Shakespeare* (1863). Consult Ireland, *Actors and Actresses of Great Britain and the United States*, edited by Matthews and Hutton, vol. iii. (New York, 1886).

HACKETT, JAMES KETELTAS (1869—). An American actor, son of James Henry Hackett. He was born at Wolfe Island, Ont., and was educated at the College of the City of New York, where he graduated in 1891. He made his appearance on the stage in A. M. Palmer's company in 1892, and after several engagements became, early in 1896, leading man at the Lyceum. Plays in which he became best known are: *The Prisoner of Zenda* (1896); *Rupert of Hentzau* (1898); *The Pride of Jennico* (1900); *Don Cæsar's Return* (1901); and *The Crisis* (1902). In 1897 he married the actress Mary Mannering. Consult Strang, *Famous Actors of the Day in America* (Boston, 1900).

HACKLÄNDER, häk'lēn-dēr, FRIEDRICH WILHELM VON (1816-77). A German novelist and dramatist, born at Burtscheid. He won a wide reputation by his *Bilder aus dem Soldatenleben* (1841) and *Das Soldatenleben im Frieden* (1844). The keen observation and lively humor of the first of these books brought him an invitation to accompany Baron von Taubenheim to the Orient, as a result of which he wrote *Daguerreotypen* (1842), later known as *Reise in dem Orient* (1846); and *Pilgerzug nach Mekka* (1847), a collection of Oriental legends and tales. In 1849 he went through the campaign in Piedmont, and his experiences resulted in the *Bilder aus dem Soldatenleben im Krieg* (1849-50). In 1855 he founded the popular weekly, *Ueber Land und Meer*, at Stuttgart, the home of his later years. Of his other works, the more noteworthy are: *Der geheime Agent* (1850), a very popular and often translated comedy; *Wachtstubenabenteuer* (1845), scenes of military life; *Handel und Wandel*, a humorous novel (1850); and *Namenlose Geschichten* (1851). Hackländer left an autobiography, *Der Roman meines Lebens* (Stuttgart, 1878). Consult Morning, *Erinnerungen an Hackländer* (Stuttgart, 1878).

HACKLE, HECKLE, or **HATCHELL** (from Dutch *hekel*, heckle, from Dutch *haak*, hook). An instrument for cleaning, sorting, and straightening the fibres of raw flax, and hemp, preparatory to spinning. See FLAX.

HACK'MATACK. See LARCH.

HACK'NEY. A metropolitan borough of London (q.v.) in Middlesex, three miles northeast of Saint Paul's (Map: London, D 8). It was formerly a favorite suburban village residence of London citizens, and in its fashionable days is said to have given its name to hackney coaches. Population, in 1891, 247,594; in 1901, 270,535.

HACO. See HAAKON.

HA'DAD. One of the chief deities of ancient Syria and Assyria. The name of this deity occurs in several compound names in the Bible, namely, Hadadezer (II. Sam. viii. 3 et al.), Ben-Hadad (I. Kings xv. 18 et al.), and Hadad-Rimmon (Zech. xii. 11); and is mentioned by Macrobius (*Saturnalia*, i. 23, 18). The god is identical with Adad, who appears among the great gods of Babylonia and Assyria. Through cuneiform documents it is likewise clear that Hadad-Adad was a storm-god, who was also known by various epithets, such as Ramman (thunderer), Bir, and Dadda, though in Syria he is a solar deity. Hadad also appears in the Old Testament as the name of various kings or princes of Edom (Gen. xxxvi. 35; I. Chron. i. 50; I. Kings xi. 14).

HADADEZER, hăd'ăd-ē'zēr. King of Zobah, an Aramæan State, in the eleventh century B.C. (II. Sam. viii. 3). Zobah is probably identical with the Assyrian *Zubiti*, which seems to have been situated north of the territory occupied by Maachah and Ammon in Hauran (q.v.), or immediately west of this district. Hadadezer is said to have been a son of Rehob. His name is apparently a Hebraized form of Hadadidri, 'Hadad is my help,' which occurs in an Assyrian inscription of Shalmanezer II. (B.C. 860-825). According to II. Sam. viii. 3-12, Hadadezer was defeated by David, although the Aramæans of Damascus came to his assistance, and the gilded armor of his servants was carried to Jerusalem. Vessels of bronze were also captured in the cities of Tebah (or Betah) and Berotai, which belonged to Hadadezer. The location of these towns cannot be determined at present. After the battle, Tou (or Toi), King of Hamath (q.v.), sent his son Hadoram (or Ioram) to congratulate David, because he had himself been at war with Hadadezer. A later narrative, found in II. Sam. x. 15-19, gives an account of a second campaign by David ending with a defeat of Hadadezer at Helam (probably Alima, east of the Jordan). One of Hadadezer's servants named Rezon fled from his master, and became the founder of a new dynasty at Damascus (I. Kings xi. 23). Consult: Winckler, *Geschichte Israels* (Leipzig, 1895); and the commentaries on Samuel by Klostermann (Nördlingen, 1887), Henry Preserved Smith (New York, 1899), Budde (Tübingen, 1902), and Nowack (Göttingen, 1902).

HA-DANI, hä-dä'nē. A Jewish traveler of the ninth century. See ELDAD HA-DANI.

HAD'DAN, ARTHUR WEST (1816-73). An English ecclesiastical historian, born at Woodford, in Essex. He was educated at Brasenose, and Trinity College, Oxford, where he afterwards became a fellow. The High Church revival at Oxford, which occurred during his residence there, enlisted his warmest support, and in 1869 he published his *Apostolic Succession in the Church of England*, which was reprinted in 1879 and in 1883, and remains the best work on the subject. Among his other publications are *Councils* and *Ecclesiastical Documents* (1869-73).

HAD'DINGTON. The capital of Haddingtonshire, Scotland, on the banks of the Tyne, 16 miles east of Edinburgh (Map: Scotland, F 4). It is an important grain market, and possesses the second largest corn exchange in Scotland. Noteworthy buildings are the old Abbey Church, the Lucerna Laudoniæ (Lamp of Lothian), the county buildings, town hall, and the Knox Memorial Institute. Haddington is a very ancient royal burgh, its charter dating from the eleventh century. It owns its water-works. King Alexander II. (born 1198), John Knox, John Brown and his grandson Samuel, Samuel Smiles, and Mrs. Jane Carlyle were natives of Haddington. Population, in 1891, 3771; in 1901, 3992.

HAD'DINGTONSHIRE, or EAST LOTHIAN. A maritime county in the southeastern part of Scotland, bounded north and east by the Firth of Forth and the North Sea, south and southeast by Berwickshire, and west by Midlothian (Map: Scotland, F 4). In the south of the country are the Lammermuir Hills, rising to the height of 1732 feet. The principal river is the Tyne, which flows northeast across the county into the sea at Tyningham. Haddingtonshire has enjoyed high agricultural fame since the seventeenth century; coal is mined at various points. The principal towns are Haddington (the capital), Dunbar, and North Berwick. Population, in 1891, 37,377; in 1901, 38,660.

HAD'DO (American Indian). A local name on Puget Sound for the humpbacked salmon.

HADDOCK. A fish (*Melanogrammus æglefinus*) of the cod family. It resembles the common cod very much, but can readily be distinguished by the black lateral line, that of the common cod being white. It has three dorsal and two anal fins, and a barbel at the symphysis of the lower jaw. There is a black spot behind each of the pectorals, these spots sometimes extending so as to meet on the back. A ridiculous legend ascribes these spots to the finger and thumb of Saint Peter, and says the haddock is the fish from the mouth of which he took the tribute money.

This valuable fish is abundant on both coasts of the North Atlantic southward to France and North Carolina, but does not range so far north as the cod, though abundant about Iceland. They consort with the cod, but seem to be much more gregarious, and swim about in large schools. Some years they are far more rare at the fishing-grounds than in others. As they live very largely on mollusks, they are likely to be numerous on the clam-banks; and in their feeding and habits generally they closely resemble the cod, varying mainly in the practice of keeping close to the bottom. In April they approach the shore and spawn. They remain near the shore about six weeks and then return to deep water. An ordinary female will produce annually more than a million eggs, resembling those of the cod, and to be treated in the same way in fish culture. The haddock fishery (see FISHERIES) is of great importance on both coasts. This species, which usually weighs about six pounds, is especially salable in the markets of Boston and Philadelphia, and is one of the easiest to transport in ice. They are also smoked successfully, after the Scotch method, which produces 'finnan haddie' (Finland haddock). See Plate of CODFISH AND ALLIES.

HAD'DOCK, Sir RICHARD (1629-1715). An English admiral, son of William and grandson of Richard Haddock, both of whom were officers

in the English Navy. He commanded ships in various actions during the wars with Holland from 1657 to 1674, and in the battle of Solebay (May 28, 1672) fought his ship, the *Royal James*, so gallantly that when he was presented to the King after his return to England, the latter, as a mark of favor, took off the cap he was wearing and put it on Haddock's head. He was knighted in 1675, and in 1690, after the battle off Beachy Head, was made admiral, and, in conjunction with Henry Killigrew (q.v.) and Sir John Ashby, commander-in-chief of the fleet.

HAD'DON, WALTER (1516-72). An English philologist, born in Buckinghamshire. He was invited to enter Cardinal College, Oxford, but preferred Cambridge, to which he had been elected from Eton. Together with Cheke, he labored for the reform of the ecclesiastical laws, and in 1571 the result of their work was published under the title *Reformatio Legum Ecclesiasticarum*. He was appointed master of Trinity Hall in 1551-52, and soon afterwards succeeded Owen Oglethorp as president of Magdalen College, Oxford. This appointment, however, was at variance with the founder's statutes, and Queen Mary, soon after her accession to the throne, caused Oglethorp to be reinstated. His sympathies were with the cause of Protestantism, and in 1563 he answered a letter published by a Portuguese priest named Jerome Osorio da Fonseca exhorting Queen Elizabeth to become a Roman Catholic. This was the beginning of a controversy which continued until his death. During his lifetime he enjoyed a great reputation as a writer of Latin prose; but later critics have not held his works in as much esteem as did his contemporaries.

HADDON HALL. A fine specimen of the English baronial mansion, situated two miles southeast of Bakewell, in Derbyshire, England. It was originally in the possession of the Avenel family, but in the twelfth century passed into the hands of the Vernons, and, by the romantic marriage of Dorothy Vernon with Sir John Manners, became, in the sixteenth century, the seat of the Rutland line. The building incloses two courtyards, and combines the late Norman with the Renaissance style of architecture.

HA'DEN, Sir FRANCIS SEYMOUR (1818—). An English surgeon and etcher. He was born in London, September 16, 1818. He was educated at University College, at the Sorbonne, and at the medical schools of Paris and Grenoble; was admitted a fellow of the Royal College of Surgeons of England (1857); distinguished himself by his studies in ovariotomy and by his writings against cremation; but is best known as an etcher and an authority on etching. He was the founder and first president of the Society of Painter Etchers, and has published: *The Etched Work of Rembrandt* (1879-80); *Lectures*; and *About Etching* (1881); a collection of twenty-five plates from his own hand are contained in *The Etched Work of F. S. Haden* and *Etudes à l'eau forte* (1865-66). He married Miss Whistler of Baltimore in 1847, and visited the United States in 1882. Many of his etchings have been exhibited in New York and Boston. The subjects of his plates are largely English landscapes. Among the best known are: "Breaking Up of the Agamemnon," exhibited at the Philadelphia Exposition in 1876; "Bulais Pier," after Turner; and, especially, "Twickenham Church."

HADERSLEBEN, hä'dērs-lā'ben. The capital of the circle of the same name in the Prussian Province of Schleswig-Holstein, situated on the Hadersleben Fiord, 32 miles north of Flensburg (Map: Prussia, C 1). Its Church of Saint Mary, originally erected in the thirteenth century, and rebuilt in the fifteenth century, is a handsome edifice. The town has a gymnasium dating from the sixteenth century, and a seminary for teachers. The industrial establishments comprise a foundry, machine-works, and wagon-factories. Hadersleben obtained municipal rights in 1292. It suffered greatly from the wars between Schleswig and Holstein. Population, in 1890, 8397; in 1900, 9201.

HADES, hā'dēz (Gk. Ἅιδης, *Haidēs*, or, Ἀΐδης, *Aidēs*, from *ἀ*, *a* priv., + *ἰδεῖν*, *idein*, Lat. *videre*, Skt. *vid*, to see). (1) In Greek mythology, the god of the lower world. (See PLUTO.) In late writers the word is also used to denote the realm of Hades, called by the earlier poets 'House of Hades' (*δομος Ἄϊδος*). The Greek conceptions of this region varied greatly. In the common belief it was in the depths of the earth, while another view placed the home of the dead in the far west, the region of night and sunset. Wherever situated, it was a gloomy region, with its wide gates ever open to receive newcomers, but closely guarded by Cerberus (q.v.) against any who would return. Here also was the joyless asphodel meadow, where the shades wandered in sadness. Early also arose the belief in the rivers of the lower world, Styx, Acheron, Cocytus, and Pyriphlegethon, and the ferryman Charon (q.v.). Over against these views must be placed that of the abode of happiness for the favored (see ELYSIUM), and of punishment for the wicked. (See TARTARUS.) Consult Rohde, *Psyche* (Freiburg, 1898). See GREEK RELIGION.

(2) In the Septuagint and Greek New Testament the word signifies the realm or abode of the dead. Other ancient peoples had corresponding terms. With the Egyptians the abode of the dead was Amentet (the west); the Babylonians called it Aralu (perhaps a cave); the Hebrews spoke of it as Sheol. The general idea among all these was the same — that of an undefined mysterious locality under the earth to which, in some unexplained way, the souls of the dead go, there to exist for all time to come. But as to details, no one of these ancient peoples possessed a generally accepted, consistently worked out theory. Besides the changes due to the progress of thought from age to age, in the same period many different conceptions were current, difficult if not impossible to combine into one consistent doctrine. This fact is well illustrated by the course of Hebrew and Christian thought on the subject.

The Hebrew word Sheol, which the LXX. rendered by the Greek Hades, comes from a root meaning 'hollow'; hence probably it meant the supposed great cavern or hollow under the earth where the dead abode. The term often indicates simply the grave. Another term similarly used in the Old Testament is *bor* (pit). The grave and Sheol proper are not, however, the same. The word 'hell,' so frequently used in King James's Version, originally meant much the same as Sheol. Sheol was thought of as deep down

(Deut. xxxii. 22; Ps. lxxxviii. 6, 11; Job xi. 8; Ps. lxxxvi. 13; Prov. xv. 11). The dead, though their bodies crumbled to dust in the graves, here continue a bodiless, shadowy sort of existence. They find themselves grouped according to earthly relationships, so that one who dies is 'gathered to his fathers.' They retain in some way their general appearance at the time of death (cf. the realistic narrative I. Sam. xxviii. 8-14). They also are possessed of unusual knowledge, so that there was a morbid curiosity to inquire of the dead through those who had 'familiar spirits'—i.e. whom the 'spirit' of the dead used as a medium of communication. Such conceptions were quite prevalent in early Israel; the Hebrews shared them with the old Semitic world about them. The state was a permanent one, looked upon as the normal consequence of a life lived out to its full length. To go to Sheol before one had filled out his days was a misfortune, a calamity; but not, apparently, because the condition there was supposed to be in itself unhappy, or affected by the time of one's death. A violent death, however, seemed to endanger one's peace in Sheol (cf. Num. xvi. 30, 33; I. Kings ii. 6, 9; Ps. lv. 15). Jehovah was said to 'save from Sheol' when He delivered from impending death (cf. Psalms, passim). In Sheol all were supposed to meet on a common level, good and bad alike (cf. I. Sam. xxviii. 19). No vital connection with Jehovah belonged to the existence there. It was a gloomy, unattractive place.

In later years, near and after the Exile, modifications began to be introduced into these early conceptions of the Hebrews, due in part, perhaps, to fuller acquaintance with Babylonian ideas. Hence we find the questionings and faint hopes of Job and some of the Psalms. These later conceptions were more definite than the earlier ones. We now read of the bars of Sheol (Job xvii. 16), of its 'uttermost parts' (Is. xiv. 15-19; cf. Ezek. xxxii. 23), assigned, apparently, to special classes of the dead; of the nations with their kings on thrones, etc. (Ezek. xxxii.). Its gloom is more keenly felt now. In it there is no remembrance of Jehovah, no praise, no work, no desire, only a negative existence (Ps. vi. 5; lxxxviii. 5-12; Eccl. ix. 5-10). It is under Jehovah's power, but not where His presence is felt and enjoyed. Hence the tendency arose either (1) to conceive of the existence in Sheol as of two varieties—one most unhappy, the fate of the especially wicked, the other more like non-existence; or (2) to think that the good did not need to go to Sheol, or might at last be released from it. See as to (1): Ps. lxxxviii. 4-7; ix. 17; Prov. v. 5; Ezek. xxxi. 17; xxxii. 21; and as to (2) Gen. v. 24; Ps. xlix. 15; Job xiv. 14; xix. 25, 26; Is. xxvi. 19; Dan. xii. 2.

These tendencies were further developed in the last three pre-Christian centuries, and find full expression in the great body of Apocalyptic literature belonging to this period. Hades came to be thought of as definitely divided into two main parts, each capable of subdivision, one the place of the righteous dead, the other that of the wicked. From the abode of the righteous a resurrection to a new blessed life was thought possible or probable; the wicked were doomed to stay in their already unhappy abode, or to meet with a further punishment in Gehenna—i.e. the place of fiery torment. In close connection with Gehenna was the great Abyss, in which the evil angelic spirits met their due reward. In such developments the influence of Greek mythology is perceptible.

The New Testament writings reflect these popular conceptions, and use them to illustrate their teachings. Hence we find Jesus, in the parable in Luke xvi. 19-31, speaking of Hades, where the rich man was tormented, and in its neighborhood, if not in Hades itself, 'Abraham's bosom,' where Lazarus is comforted. He refers to the 'everlasting fire' prepared for the Devil and his angels and for wicked men (Matt. xxv. 41), and to 'Paradise,' where the repentant thief would be with Him after death (Luke xxiii. 43). But such statements do not contain definite doctrine. The same may be said of other New Testament references to the post-mortem condition of the soul; such, e.g. as are found in Rev. i. 18; vi. 8, etc. The bulk of the positive teaching of the New Testament has reference to the resurrection and its implication—the positive and blessed fellowship of repentant souls with their Heavenly Father. In view of this truth, thought and teaching in regard to Hades were relegated to a secondary place, and lost their importance. Consult: Salmond, *Christian Doctrine of Immortality* (3d ed., Edinburgh, 1897); Alger, *A Critical History of the Doctrine of a Future Life* (New York, 1871); Charles, *Critical History of the Doctrine of Future Life* (London, 1897); Jastrow, *Religion of Babylonia and Assyria* (Boston, 1898). See ABADDON; ABYSS; ESCHATOLOGY; GEHENNA; HELL; IMMORTALITY.

HADIK VON FUTAK, hä'dĭk fŏn fōō'tȧk, ANDREAS, Count (1710-90). An Austrian general, born on the island of Schütt (formed by the Danube, between Pressburg and Komorn), of an ancient noble family of Hungary. He distinguished himself in the wars against France and Prussia by his bravery and strategical skill. He was advanced to the rank of general in 1747. In the second year of the Seven Years' War (1757) he suddenly made a descent on Berlin and levied upon the city a tribute of 300,000 thalers, which he distributed among his soldiers. After the treaty of peace (1763) he became Governor of Transylvania. He was commander-in-chief of the Austrian Army during the Turkish campaign of 1789, but was compelled by illness to resign his command to Laudon. His diary contains much interesting information on the military history of the eighteenth century.

HADING, ȧ'dăn', JANE (1859—). The stage-name of Jeanne-Alfrédine Tréfouret, a French actress, born at Marseilles. Her first appearance on the stage, she has recorded, was when she was three years old. At the age of fourteen, after dramatic studies at the Conservatoire of her native city, she began her career in Algiers and Cairo. She first appeared in Paris in 1879, when she sang in *La petite mariée* and *La belle Lurette*. She was engaged in 1885 at the Gymnase, under the direction of M. Victor Koning, who afterwards was her husband, and she established her popularity by her enormous success in Ohnet's *Le maître de forges;* in *Frou Frou* (1886) she added still further to her reputation. She contributed to the success of M. Lavedan's *Prince d'Aurec* in June, 1892, and afterwards joined the Comédie Française. Sardou chose her for the title rôle of his *Marcelle* in 1896. She appeared in many parts of Europe and in South

America, as well as in the United States, where she became best known by her tours with Coquelin in 1888 and 1894.

HAD'ITH (Ar. *hadith*, tradition, from *hadatha*, to occur). The general designation in Arabic for a story or tradition, but more specifically applied to the traditions about Mohammed, the prophet's sayings and doings, which, as a complement to the Koran, form, together with it, the supreme authority for all religious and legal questions of the Mohammedans. Originally the traditions were transmitted orally; but the danger of their being entirely forgotten gradually led to their being written down in the first centuries after Mohammed. The earlier collections, however, possess only individual authority, and make no claim to systematic arrangement or comprehensiveness. Such collections are known as *musnads*, 'genealogical chains,' from the fact that each tradition is traced back to its ultimate authoritative source. Eight of such musnad collections are known to us, though many more were produced. The higher class of Hadith literature, however, is represented by collections termed *musannat*, 'systematized,' in which the traditions are divided according to subjects and treated with reference to their ritualistic, historical, and ethical import. The attempt is made to carry each utterance of the prophet back from one source to the other, until a contemporary of Mohammed is reached, and if the chain is complete the tradition is considered to be of the first class; the value of the defective traditions varies again according to the number of links missing, and the names of those who have transmitted the traditions. It will be seen that in this way the door is opened for almost endless variety of opinions as to the exact value of this or that tradition. The principal and most authoritative collections of traditions are those of Bokhari, Moslim, Abu Daud, Tirmidi, Nasa'i, and Maja. Of these again, which were all produced in the ninth century, the most important code is the *Sahih* of Bokhari (810-870), who, it is said, spent sixteen years of his life in traveling through the length and breadth of the land for the purpose of collecting such traditions, and who singled out, from a number of 60,000, about 7270, as alone genuine. Besides numerous editions published within the last fifty years in the Orient, a standard European edition of the *Sahih* was published by the later Professor Krehl, *Le recueil des traditions musulmanes, par . . . al-Bokhari* (Leyden, 1862-68). The six authoritative Hadith collections are far from exhausting the Hadith literature. Every generation, almost, produced collections of traditions aiming to fill out gaps or to determine the value of traditions. In this way an enormous Hadith literature grew up which is fully discussed by Goldziher, in his *Mohammedanische Studien*, vol. ii. (Halle, 1890). See SUNNA; MOHAMMEDANISM; KORAN.

HADJEMIS, hăj'ē-mĭz. A name applied to the Iranian population of that part of Persia between Ispahan and Teheran, including also the Talych and Mazandarani of the shores of the Caspian. In stature they are generally above the average; their head form is dolichocephalic, or tends to be such. See PERSIA, section *Ethnology*.

HAD'LEY. A town, including several villages, in Hampshire County, Mass., three miles northeast of Northampton; on the Connecticut River, and on the Boston and Maine Railroad (Map: Massachusetts, B 3). It is in an agricultural region, and has two public libraries. The government is administered by town meetings. Population, in 1890, 1669; in 1900, 1789. Settled as Norwottock in 1659, Hadley was incorporated under its present name (from Hadley, England) in 1661. The regicides Goffe and Whalley were concealed here for some years after 1664; and there is a tradition that in 1675 the former suddenly appeared, put himself at the head of the people, and saved the town from an Indian attack. Consult Judd, *History of Hadley* (Northampton, 1863).

HADLEY, ARTHUR TWINING (1856—). An American educator, who became president of Yale University in 1899. He was born at New Haven, Conn., the son of Prof. James Hadley. He graduated at Yale in 1876, and pursued advanced studies at Yale and Berlin. In 1879-83 he was tutor in Yale College. He was university lecturer on railroad transportation from 1883 to 1886; commissioner of labor statistics for Connecticut from 1885 to 1887; professor of political science at Yale University, 1886-98; and in 1899 was made president. He was president of the American Economic Association, 1897-99. In 1885 he published *Railroad Transportation: Its History and Its Laws*, which at once gained him the position of an authority on the subject; it was translated into Russian in 1886, and into French in 1887. In the same year he was summoned as expert witness before the Cullom State Committee, which drafted the Interstate Commerce Law. He also published: *Report on the Labor Question* (1885); *Report on the System of Weekly Payments* (1886); *Economics* (1896); *Education of the American Citizen* (1901). He contributed numerous essays on political and economic subjects to scientific and popular periodicals, and is the author of the articles on transportation in Lalor's *Cyclopædia of Political Science*. President Hadley's writings place him in the first rank among American economists.

HADLEY, HENRY K. (1871—). An American composer, born at Somerville, Mass. In Boston he studied with George W. Chadwick and Stephen A. Emery, but subsequently completed his musical education in Vienna. Upon his return to America in 1895 he was appointed instructor of music at Saint Paul's School, Garden City, Long Island. Previous to that, Damrosch's orchestra had performed Hadley's concert overture, *Hector and Andromache*, and in 1897 his *Symphony of Youth and Life* was performed by the New York Philharmonic Society, under Seidl's direction. On December 20, 1901, the same organization gave the first performance of a second symphony, *The Four Seasons*, which had received the prizes offered by the New England Conservatory of Music and the Paderewski Fund. In addition, his works include orchestral suites, vocal pieces for solo and chorus, instrumental trios, quartets, etc., and numerous songs, which are among the very best of their class.

HADLEY, JAMES (1821-72). A distinguished linguist and classical scholar, born at Fairfield, N. Y. An accident in boyhood made him hopelessly lame, and deprived him of all hope of an active life. He graduated from Yale College, first in his class, in 1842, and in 1844 he was

made tutor in Middlebury College (Vermont). In the following year he was appointed tutor at Yale, and in 1848 became assistant professor of Greek. In 1851 he was elected professor to succeed Dr. Woolsey, and continued to hold this office until his death. Although he had taken a theological course at New Haven immediately after graduation, Professor Hadley devoted himself to the study of languages. He was very efficient as a teacher, and became one of the most eminent linguists of his time. In addition to Greek, he was familiar with Sanskrit, Hebrew, Arabic, Latin, Gothic, Armenian, Gaelic, Swedish, and the principal modern languages. He was also well versed in early English, and was the author of *The History of the English Language* in the introduction to the earlier editions of Webster's Dictionary. He published a *Greek Grammar* (1860), based on that of Curtius, which, as revised by Prof. F. D. Allen, of Harvard University (1884), has maintained a place with that of Goodwin as standard in American schools and colleges. An *Essay on the Greek Accent* was republished in Curtius, *Studien zur griechischen und lateinischen Grammatik*. Ex-President Woolsey edited a posthumous volume of his lectures on *Roman Law* in 1873, and in the same year Prof. W. D. Whitney edited a second volume of twenty *Philological and Critical Essays*.—His brother HENRY H. HADLEY was a professor of Hebrew in Union Theological Seminary, and his son ARTHUR is president of Yale University.

HADLEY, JOHN (1682-1743). An English mathematician and physicist. He became a fellow of the Royal Society in 1717, a member of its council in 1726, and its vice-president in 1728. Although showing considerable power in higher mathematics, as evidenced in some of his astronomical papers, it is by his improvements in the reflecting telescope (1719-20) that he is best known. By means of the improved instrument Hadley and his friend Bradley were able to make important discoveries relative to the satellites of Jupiter and Saturn. He also suggested (1730) a valuable improvement to the quadrant. See GODFREY, THOMAS.

HADRAMAUT, hä'drä-mąt'. A region of Southern Arabia, along the Gulf of Aden, between Mahra on the east and Yemen on the west (Map: Turkey in Asia, R 12). Its area is about 100,000 square miles. The coast rises in terraces, which are succeeded by the mountainous border of a tableland. This strip of mountains attains 8000 feet. The tableland behind slopes to the north, and finally disappears in the great desert of the interior. Hadramaut is mostly barren. In its valleys, of which the Wadi Doan is the best known, the vegetation is often very luxuriant, and a number of important communities are found. The population is estimated at 500,000, and includes a race of Bedouins. The chief towns are Terim and Shibam, in the interior, and Makalla, a port. A part of the country is under the protection of England.

HA'DRIAN (PUBLIUS ÆLIUS HADRIANUS) (76-138). A Roman Emperor (A.D. 117-138). He was born in Rome, January 24, A.D. 76. During the reign of Trajan, who was his guardian, and with whom he was connected by marriage, he filled several high offices in the State. He accompanied the Emperor in his wars against Decebalus, where he distinguished himself by his bravery; and in 117, when Trajan set out on his return to Italy from the East, he was left behind with the army as Governor of the Province of Syria. When the intelligence reached Antioch that Trajan had died in Cilicia on his journey home, Hadrian was proclaimed Emperor by the army (August 11, A.D. 117). The state of the Empire at the time was extremely critical. Insurrections had broken out in Egypt, Palestine, and Syria; Mœsia in the east and Mauritania in the west were both invaded by barbarian hordes, while the Parthians had once more defied the Roman power and won several successes over the Imperial forces. Hadrian, perceiving the advantage of a peaceful policy, wisely resolved to limit the boundaries of the Roman dominion in the East, and concluded a peace with the Parthians, surrendering to them all the country beyond the Euphrates. In 118 he returned to Rome, established his authority by liberality toward the people, and suppressed with great severity a patrician conspiracy against his life. The Roxolani, who had made an inroad into Mœsia, were by large gifts induced to retire. In the year 119 he set out on his long travels, visiting Gaul, Germany, Britain (where he built the famous wall extending from the Solway to the Tyne), Spain, Mauritania, Egypt, Asia Minor, and Greece, whence he returned to Rome A.D. 126 or 127, and received the title of *pater patriæ*, after which he resumed his travels through the Empire. He spent the years 132 and 133 in Athens, for which city he had a great predilection. At this time occurred the great rising of the Jews under Bar-Cochba (q.v.). After once more visiting Syria Hadrian returned to Italy, and spent the last years of his life at Rome and Tibur (Tivoli). During the severe illness which carried him off, July 10, 138, at Baiæ, he was subject to violent outbursts of cruelty, to which, as well as to jealousy and pleasure, he was naturally addicted. After the death of Lucius Ceionius Commodus, whom he had adopted under the name of Lucius Ælius Verus, he appointed Titus Aurelius (afterwards the Emperor Antoninus Pius) his successor. During his reign the army was vigorously disciplined and reorganized, while as a civil ruler he merits high praise for the just and comprehensive view he appears to have taken of his duties as a sovereign. To him is attributed, more than to any other, the consolidation of the monarchical system of Rome. Hadrian divided Italy into four districts, in charge of men of consular rank, to whom he intrusted the administration of justice. He erected numerous splendid edifices, the chief of which were, in Rome, the Temple of Venus and Rome, the mausoleum called the *Moles Hadriani* (now called Castel Sant' Angelo), the Ælian Bridge leading to it, and the magnificent villa at Tibur. He likewise laid the foundations of several cities, the most important of which was Hadrianopolis (Adrianople). Hadrian was a lover of fine arts, of poetry, philosophy, and rhetoric.

HA'DRIAN, ARCH OF. A well-preserved triumphal arch at Athens, southeast of the Acropolis. It was built either by Hadrian or by his successor, and divided the ancient city of Theseus from Hadrianopolis, the new city of Hadrian. The arch is 59 feet in height and 44

in width, with a single archway 20 feet wide, surmounted by an attic with three openings. The inscriptions fronting the new and the old city are still in place.

HADRIAN, Tomb of Mausoleum of (Lat. *Hadrianum*). The massive building in Rome now known as the Castel Sant' Angelo. It was erected in A.D. 136 by the Emperor Hadrian, together with the Ælian Bridge (Ponte Sant' Angelo), which gave access to it. The tomb was situated in the gardens of Domitia, on the bank of the Tiber. It consisted of a basement 247 feet square, surmounted by a circular mass of masonry 230 feet in diameter, both faced with Parian marble. The whole was crowned with a cone of earth planted with evergreens. The tomb was adorned with statues and surrounded by a gilt bronze railing with gilt peacocks, two of which are preserved in the Vatican gardens. The front of the basement had panels bearing the names of the members of the Imperial family buried in the tomb. The entrance to the burial-chamber was in the front, facing the bridge. The structure was fortified in the time of Honorius, and was the centre of the factional strife during the mediæval and modern history of Rome. The castle was held by the popes from the time of Boniface IX., and about 1500 was connected with the Vatican by a subterranean passage. The ancient structure is almost concealed by the works of fortification which have been added to it, and has been despoiled at various times. The marble tombstones were used by Gregory XIII. in the construction of his Gregorian Chapel in the Vatican, and the mausoleum supplied the materials with which the Sistine Chapel was built. The gilt angel sheathing his sword, and with outstretched wings, on the pinnacle of the structure, is a modern work, taking the place of previous statues destroyed or stolen during the Middle Ages. It commemorates the appearance of the Archangel Michael to Gregory the Great during a plague.

HADRIAN'S VILLA. A magnificent country place laid out and built by the Emperor Hadrian near Tibur (Tivoli). It covered an area of several square miles, and its different parts bore the names of famous scenes and buildings which Hadrian had visited in his travels. It contained gardens, theatres, a stadium, apartments, baths, colonnades, terraces, and many artificial landscape features, carried out with lavish use of costly materials, which were subsequently used in the construction of other buildings. The ruins, in great part preserved, have for centuries yielded important works of ancient art, now in the various museums of Rome.

HADRIAN'S WALL. See Roman Wall.

HADROME, hăd'rōm (from Gk. *ἁδρός*, *hadros*, thick). The conducting portion of the woody part of a vascular bundle. It includes the vessels, tracheids, and wood parenchyma, but not the libriform cells. Where the libriform cells are lacking altogether, as is generally the case in monocotyledons, the hadrome and xylem are identical. See Leptome and Mestome.

HAD'ROSAU'RUS (Neo-Lat., from Gk. *ἁδρός*, *hadros*, thick + *σαῦρος*, *sauros*, lizard). A gigantic fossil lizard of the dinosaur group, found in the Cretaceous sandstones of Wyoming. The shape of the animal was very peculiar. With a length of 35 feet, it had a small head, short feebly built fore legs and strong hind limbs, and heavy tail. Its jaws were broadened laterally to form a flattened bill like that of a duck. Portions of thick rhinoceros-like hide were found associated with the skeleton. The animal is considered to have been an amphibian, feeding on succulent marsh plants, for which habit its flattened beak seems to have been peculiarly adapted. See Dinosauria.

HAD'RUME'TUM (Lat., from Gk. *Ἀδρούμητος*, *Hadroumētos*). An ancient city on the African coast of the Mediterranean on the Gulf of Hammamet (Tunis). A Phœnician colony which claimed to be of earlier date than Carthage, in course of time it became subservient to the Imperial city, and fell along with it under the power of the Romans. On the subdivision of the Roman Province of Africa Propria, it became the capital of Byzacium. By Trajan it was made a colony—*Colonia Concordia Ulpia Traiana Augusta Frugifera Hadrumetina.* From the devastation inflicted by the Vandals, it was restored by Justinian, and in consequence it bore for some time the name of Justinianopolis. It is now called Susa.

HAECKEL, hĕk'l, Ernst (1834—). A German zoölogist and natural philosopher, born at Potsdam. He studied medicine and the natural sciences at Berlin, under Johannes Müller, and at Jena. After taking his medical degree at Berlin, he practiced medicine for a year, and then, having decided to devote himself to the natural sciences, he studied marine life in Heligoland, Messina, and Naples. In 1861 he became privat-docent, in 1862 professor extraordinarius, and in 1865 professor of zoölogy at Jena. He made numerous scientific journeys, to the Canary Islands, to Norway, the Adriatic, the Red Sea, Corsica, Sardinia, Ceylon, and Java. He published: *Die Radiolarien* (1862); *Die Hydromedusen* (1865); *Entwicklungsgeschichte der Siphonophoren* (1869); *Moneren und andere Protisten* (1870); *Die Kalkschwämme* (1872). The last named work is an important monograph upon calcareous sponges, in which an attempt is made to arrange them in a natural system; the proposition being that the layers forming the body-wall are also homologized with the ectoderm and endoderm of the gastrula. This is the basis laid for the celebrated gastræa theory. Other investigations are: *Arabische Korallen* (1876); *Das System der Medusen* (1880-81); *Reports on the Radiolaria; on the Deep Sea Medusæ; on the Deep Sea Keratosa; on the Siphonophora Collected by the Challenger* (1882-88); *Plankton-Studien* (1890). Haeckel's philosophical writings were first inspired by Darwin's *Origin of Species.* In 1866 appeared *Die generelle Morphologie der Organismen,* which was the first attempt to apply the general doctrine of development to the whole field of morphology, and also to found a classification of animals and plants based upon the doctrine of their common relationship. In it he formulates the celebrated 'biogenetic' law, already stated by Von Baer, Agassiz, and Fritz Müller. In 1868 appeared *Natürliche Schöpfungsgeschichte,* translated into English as the *History of Creation,* which is a popular exposition of the doctrine of evolution, and has had the widest circulation and done more to popularize Darwinism in Germany than any other book. *Ueber die Entstehung und den Stammbaum des Men-*

schengeschlechtes (1870) and *Anthropogenie* (1874) treat specially of the descent of man. In *Die Gastræatheorie* (1874) he traces the phyletic history of all the great groups of the animal kingdom, and finds for all of them a common ancestor in the hypothetical gastræa. (See GASTRÆA THEORY.) Haeckel's influence upon contemporaneous thought has been very great. As a popular scientific writer and lecturer he has spread the knowledge of the principles of Darwinism throughout Germany and Europe, while his speculations on the phyletic history and ancestry of the various groups of animals, and his attempts to classify them so as to express their relationships and common descent, although often erroneous, have stimulated investigation and led the way to the correct interpretation of phenomena. He is one of the best-known exponents of the monistic philosophy, which he has advocated in most of his speculative writings. His most important contribution to it is *Die Welträtsel. Gemeinverständliche Studien über monistische Philosophie* (4th ed. 1900), which has been translated into English as *The Riddle of the Universe* (1902). In 1883 was published a popularly scientific account of a journey to the East Indies, translated into English under the title *oi A Visit to Ceylon.* The fourth German edition is entitled *Insulinde.*

HÆMAMŒBA LAVERANI. See SPOROZOA.

HÆMANTHUS, hē-măn′thŭs. See BLOOD-FLOWER.

HÆMATEMESIS, hĕm′ȧ-tĕm′ē-sĭs (Neo-Lat., from Gk. *αἷμα, haima,* blood + *ἔμεσις, emesis,* vomiting, from *ἐμεῖν, emein,* to vomit). Vomiting of blood. A symptom of ulcer or cancer of the stomach or of the œsophagus, hemorrhage from the lining of the stomach (as in alcoholism, poisoning, yellow fever, or purpura hæmorrhagica), or cirrhosis of the liver. The blood may be fresh or clotted, mixed with ingesta or with mucus. The treatment of this symptom is rest on the back, small pieces of ice swallowed, and absolute avoidance of solid and sometimes even liquid food, and of alcoholic drinks. It is a symptom of so much importance and gravity that the aid of a competent physician should be at once obtained wherever possible.

HÆMATIN, hĕm′ȧ-tĭn (from Gk. *αἷμα, haima,* blood), $C_{34}H_{35}N_4FeO_5$, or, according to some chemists, $C_{32}H_{32}N_4FeO_4$. A bluish-black substance obtained, together with a proteid, when the oxyhæmoglobin of blood is treated with acids or alkalies, or is acted on by the gastric or pancreatic juice. It is chemically very stable, the caustic alkalies, hydrochloric and nitric acids, having no effect on it, and it does not decompose even at as high a temperature as 180° C. It is insoluble in water and in the ordinary organic solvents, but dissolves readily in alkaline solutions. By the action of sulphuric acid it is transformed into hæmato-porphyrin, a substance that contains no iron and has also been obtained by decomposing chlorophyll (q.v.), the green coloring matter of plants. Pure hæmatin may be prepared from hæmin by boiling with acetic acid, washing with water, alcohol, and ether, dissolving in dilute potash, and precipitating with hydrochloric acid; the hæmatin thus precipitated is carefully washed with hot water and dried at 130°-150° C. Hæmatin may also be obtained directly from blood, the following being a convenient method of preparation: defibrinated blood is mixed to a thin paste with potassium carbonate, the paste is evaporated to dryness on a water-bath, and the residue is extracted with boiling alcohol; the solution thus obtained is made acid by carefully adding sulphuric acid, is filtered, again made alkaline by adding an excess of ammonia, and then evaporated to dryness; on washing the residue with boiling water and drying at 130°-150° C., a fairly good specimen of hæmatin is obtained.

HÆ′MAT′OCELE (from Gk. *αἷμα, haima,* blood + *κήλη, kēlē,* tumor). A tumor containing blood.

HÆMATOXYLIN, hĕm′ȧ-tŏks′ĭ-lĭn (from Gk. *αἷμα, haima,* blood + *ξύλον, xylon,* wood). A chromogen (a term used by chemists to denote certain nearly or quite colorless substances which, under certain influences, yield well-marked colors) obtained by extracting logwood (*Hæmatoxylon campeachianum*) with ether. Its composition is represented by the formula $C_{16}H_{14}O_6 . 3H_2O$, and in its pure state it occurs in transparent glistening straw-colored prisms. It has a sweet and not astringent taste, is sparingly soluble in cold water, but dissolves readily in boiling water, alcohol, and ether. The aqueous solution is not affected by the air, but if a very small quantity of ammonia is added, it assumes an intense reddish purple color. This color is due to a decomposition, of which a substance $S_8H_{12}O_5$, termed *hæmatein,* is one of the products. The compound resulting from the union of hæmatein and ammonia is represented by the formula $C_8H_{11}O_6NH_4$. Hæmatoxylin is used in the arts for producing blue and black colors. The commercial *hæmein* is an impure form of hæmatoxylin. Logwood (q.v.) contains about 12 per cent. of hæmatoxylin.

HÆM′ATOZO′A. See SPOROZOA.

HÆM′ATU′RIA (Neo-Lat., from Gk. *αἷμα, haima,* blood + *οὖρον, ouron,* urine). The appearance of blood in the urine. It is a symptom of disease of the kidneys, bladder, or prostate gland (tumor, stone, tubercle, syphilis, hypertrophy, etc.) in most cases. The treatment depends upon the condition present. Rest is important.

HÆ′MODYN′AMOM′ETER (from Gk. *αἷμα, haima,* blood + *δύναμις, dynamis,* power + *μέτρον, metron,* measure). An instrument for determining the pressure of the blood in the arteries and veins of the living body. The pressure of the blood is measured, as in the barometer, by the column of mercury that it balances. The instrument has been improved in various ways, and a contrivance added by which the oscillations of the mercury are inscribed in the form of an undulating curve on a cylinder made to revolve by clockwork. Recently instruments have been introduced by means of which the blood-pressure can be determined in the human subject with facility and precision; these are of great clinical value. See SPHYGMOGRAPH.

HÆ′MOGLO′BIN (from Gk. *αἷμα, haima,* blood + Lat. *globus,* ball). An important substance found in red blood-corpuscles, and having the property of readily taking up oxygen from the air, and just as readily giving it up to the tissues of the body. The chemical nature of hæmoglobin is as yet little understood, and even its true chemical composition is un-

known. The compound of hæmoglobin with oxygen, called oxy-hæmoglobin, may be converted into hæmoglobin by keeping its concentrated aqueous solution for some time in a sealed tube. Crystalline hæmoglobin has a dark-red color, which differs somewhat with the direction from which the crystals are viewed. The crystals are very soluble in water, and combine readily not only with oxygen, but also with nitric oxide, carbon monoxide, and probably with carbon dioxide. When treated with acids or alkalies, hæmoglobin is decomposed, yielding (1) a proteid called globin, and (2) a colored substance known as reduced hæmatin, or hæmochronagen, which is readily converted, by oxidation, into hæmatin (q.v.).

Oxy-hæmoglobin, and probably hæmoglobin itself, vary in chemical composition and in certain physical properties according to the source from which they are obtained. The preparation of a considerable quantity of oxy-hæmoglobin from the blood of certain animals is a matter of some difficulty. To obtain oxy-hæmoglobin from dog's blood, the latter is defibrinated, strained, shaken with ether, and cooled, the oxy-hæmoglobin separating out in the form of a crystalline mass; it may be purified by recrystallizing from very little cold water, a small amount of alcohol being added to the aqueous solution. The crystals of oxy-hæmoglobin have a bright scarlet color like that of arterial blood. Their constituent elements are carbon, hydrogen, oxygen, nitrogen, sulphur, and iron. Nothing, however, is known of the chemical structure of oxy-hæmoglobin, and its molecular weight appears to be at least as high as 13,000.

Carbon-monoxide hæmoglobin may be obtained by passing carbon-monoxide gas through an aqueous solution of oxy-hæmoglobin. The highly poisonous action of carbon monoxide is due to the formation of this stable compound in the blood, by which the latter loses its capacity for carrying oxygen. Caustic soda solution produces, in blood containing carbon-monoxide hæmoglobin, a brilliant red precipitate; in normal blood the precipitate is of a brownish-green color. The presence of carbon monoxide in blood may thus be readily demonstrated by means of this test.

HÆMOPHILIA, hē'mō-fil'ĭ-ȧ, or **HÆMATOPHILIA**, hēm'ȧ-tō-fil'ĭ-ȧ (Neo-Lat., from αἷμα, *haima*, blood + φιλία, *philia*, friendship, from φιλεῖν, *philein*, to love). A constitutional disease, almost always hereditary, and characterized by a tendency to uncontrollable hemorrhage from slight wounds or even spontaneously. The cause seems to be a greatly diminished coagulability of the blood, and a congenital thinning and degeneration of the walls of the blood-vessels. It is more common in males than in females. People who suffer from this condition are termed 'bleeders.' The prognosis is poor, most cases terminating fatally in childhood, and only about one-eighth of the patients reaching the adult age. The treatment is chiefly protective. Bleeding calls for the application of cold and styptics. The resulting anæmia is treated with iron. See BLEEDING.

HÆMOP'TYSIS (Neo-Lat., from Gk. αἷμα, *haima*, blood + πτύσις, *ptysis*, expectoration, from πτύειν, *ptyein*, to spit). Raising blood from the respiratory passages by coughing. The blood may come from the blood-vessels of the larynx, of the bronchi, or of the pulmonary vesicles. If the last alternative be true, the cause may be tuberculosis; or the bleeding may take the place of menstruation. In tuberculosis it generally follows breaking down of the lung tissue, though it may be the first symptom of disease noticed. It is very rarely fatal, and in most cases should cause no alarm as to immediate evil results. Indeed, where there is incipient tuberculosis, an early hemorrhage is even beneficial in that it at once relieves congestion, and especially, by sharply calling attention to a diseased condition, induces the patient to place himself under proper treatment. It occurs most frequently in cases of slowly progressing tuberculosis. Rest and administration of morphine constitute the immediate treatment. Styptics, such as gallic and tannic acid, are of no use. In all cases of coughing up of blood, the cause should be at once accurately ascertained, and suitable treatment promptly instituted, as the hope of permanent and complete cure in tuberculosis is largely bound up in prompt and systematic treatment while the disease is in the early stages. See BLEEDING.

HÆM'ORRHOIDS. See PILES.

HÆ'MUS. The ancient name for the Balkans.

HÆRET'ICO COM'BUREN'DO (Lat., for burning the heretic). An ancient writ of the English law, directing the execution of the sentence of burning at the stake against one who had been legally convicted of heresy. It was last employed in the ninth year of James I., and was abolished by act of Parliament in 1677 (29 Chas. II., c. 9). See HERESY.

HAFENREFFER, or **HAFFENREFFER**, hä'fen-rĕf'fĕr, MATTHIAS (1561-1619). A German Lutheran theologian, born at Kloster Lorch, Württemberg. He studied philosophy and theology at Tübingen, and in 1596 was appointed professor of theology and director of the theological seminary there. In 1617 he succeeded Andreas Osiander as chancellor of the university and as provost of the cathedral. As a theologian Hafenreffer was an orthodox Lutheran, and an opponent of Calvinism, although, unlike several of his contemporaries, he did not indulge in acrimonious polemics. His principal publication, the *Loci Theologici* (1600; frequently reprinted), was used as the official text-book of Lutheran dogmatic theology in Württemberg and Sweden, where it supplanted Heerbrand's *Compendium*. His *Templum Ezechielis* was equally popular in its day.

HAFFNER, häf'nĕr, PAUL LEOPOLD (1829-99). A German prelate, born at Horb, Württemberg, and educated at Tübingen. He was ordained in 1852, and in 1886 was appointed Bishop of Mainz by the Pope, in which capacity he secured from the Hessian Government a revision of the ecclesiastical laws. In 1888 he was chosen as the leader of the pilgrims who visited Pope Leo XIII. on the occasion of his jubilee. Haffner founded several Catholic societies and wrote the work entitled *Grundlinien der Philosophie* (1881-83).

HAFIZ, hä'fĭz (?-c.1389). A Persian poet of Shiraz, and one of the world's greatest names in lyrical poesy. The time when he flourished corresponds to the period of Chaucer's fame in the West; but it was not in the field of narrative poetry that Hafiz was great; he poured forth his spirit in the song of the nightingale and the rose,

springtime and love, wine and delight. The date of his birth is not precisely known, but it must have been about the first quarter of the fourteenth century of our era. Hafiz's full name is given as Shams-ud-Din Muhammad, or Mohammed, the Sun of Religion; added to this is his title Hafiz, of retentive memory, given to one who knows the Koran and its interpretation by heart. His proficiency in various branches of knowledge brought him under the notice of the reigning House of Muzaffer, and not only was he appointed teacher in the house of the royal family, but a special college was founded for him. His spirit of independence, however, stood in the way of his worldly advancement, and notwithstanding many offers of princely favor, he remained during his whole life in the humble condition of a dervish. Although the burden of his poetical compositions is beauty in every form, we occasionally find also the praise of Allah and the Prophet, and reflections upon the instability of life and its joys; through all of them runs, however, a withering contempt of all professional piety and mock humility. These poems are of such sweetness that the poet has also received the name of Shakarlab (Sugarlip); and his contemporaries speak of his having drunk from the fountain of life, a draught of which was brought to him by Khizr (the Mohammedan Elijah) himself.

Hafiz was married, and appears to have reached a happy old age. The time of his death is variously given, but A.D. 1389 is the date now generally assigned. The enmity, however, which had been provoked by the freedom of his manners, and his more than Sufistic contempt for the outward forms of godliness, broke out undisguisedly at his death. The ministers of religion refused to repeat the usual prayers over the dead body, and after long altercations between the members of his family and his enemies, it was agreed that the question, according to the usual customs of the East, should be decided by lot. Verses selected at random from Hafiz's own handwriting were thrown into an urn, and one drawn out by a child to settle the question. The result was favorable, whereupon he was buried with great honor. Hence, perhaps, arose the custom, common in Persia, of consulting verses from Hafiz at random as an oracle. His tomb, situated about two miles to the northeast of Shiraz, has been adorned with the greatest sumptuousness by princes and nobles, and is still resorted to by pilgrims from all parts of Persia.

How far some of the odes or Ghazals (q.v.) of Hafiz are intended as an allegorical and mystical revelation of things divine in the manner of Sufism (q.v.), as is declared by Hafiz's admirers, is a question which has at different times been raised before ecclesiastical and critical courts. No doubt there is much in them that is Anacreontic; but it is equally certain that considerable weight must be given also to the Oriental interpretation of them as symbolic and mystical. The language and imagery of human love were largely employed in the East for the expression of union with the *Soul* and the *Spirit Divine*. The two passions often commingled in the expression of ecstasy; and parallels, for example, in the early seventeenth-century English poets, like Donne, Vaughan, and Crashaw, might be noticed with profit in regard to this much-mooted problem. A style brilliant yet clear, imagery gorgeous yet clothed in pure and unaffected diction, undulating melody and classical harmony—these are the chief characteristics of Hafiz's Anacreontic lyrics, which have not only become the national poetry of his country, but are even appealed to as an oracle on most important questions of peace and war. The number of their commentators is legion; the most valuable notes, however, are those of Shamii, Suru, Sidi. The *Divan*, or collection of the writings of Hafiz, was first made after his death, by his friend Mohammed Gulandam. The *Divan*, in Hammer-Purgstall's translation, inspired many of the poems in Goethe's *Westöstlicher Diwan*. Lithographed editions abound, e.g. Calcutta, 1826; Bombay, 1828, 1841, 1883; Cawnpore, 1831; Bulak, 1834 and 1840; Constantinople, 1841; Lahore, 1888; Tashkend, 1895. The best early edition, printed by Abu Talibkhan, appeared at Calcutta, 1795 (reprinted 1826). The most valuable edition is by H. Brockhaus (Leipzig, 1854-56), with a part of Sudi's Turkish commentary. Consult also Rosenzweig (with German metrical translation, 3 vols., Vienna, 1856-64). Notice also the *Nami Press Hafiz with a Glossary* (Lucknow, 1899). Of older translations into European tongues, mention may be made of Rewitzki in Latin (Vienna, 1771); Richardson, Jones, Ouseley, Hindley, Rousseau, Bicknell (1876) in English; and by Hammer-Purgstall and Daumer, in German. Easily obtainable are McCarthy, *Ghazels of Hafiz* (New York, 1893); Bell, *Poems from the Divan of Hafiz* (London, 1897); Leaf, *Versions from Hafiz* (London, 1898); Payne (London, 1901). But most important is the valuable translation, with extensive commentary and bibliography, by H. Wilberforce Clarke (London, 1891). Additional biography, critical and bibliographic material will be found in Ouseley, *Persian Poets* (London, 1846); Ethé, in *Grundriss der iranischen Philologie* (Stuttgart, 1896); Horn, *Geschichte der persischen Litteratur* (Leipzig, 1901).

HAFNER, häf'nĕr, PHILIPP (1731-64). An Austrian farce writer, born in Vienna. His principal productions are the following: *Der alte Odoardo und der lächerliche Hanswurst* (1755); *Die reisenden Komödianten* (1774), a comedy full of wit and humor; and *Dramatische Unterhaltungen unter guten Freunden* (1774). His collected comedies were published by Joseph Sonnleithner in 1872 (Vienna).

HA'GAR. According to the Book of Genesis, handmaid of Sarah, concubine of Abraham, and mother of Ishmael. The narrative (Gen. chs. xvi. and xxi.), when critically analyzed, is shown to be composed of two sources which have been combined, and now runs as follows: Sarah, having remained barren up to an advanced age, gave Hagar to Abraham for a concubine after he had been in Canaan ten years, in the hope of establishing a family of her own (Gen. xvi. 1-3; cf. Gen. xxx. 3-9). Afterwards she repented of her action and treated Hagar cruelly, so that Hagar fled into the desert, but returned on being comforted by an angel of the Lord, and bore Abraham a son who was called Ishmael (q.v.). After the birth of Isaac Sarah urged Abraham to drive Hagar and Ishmael away, and, though reluctant to do so, the patriarch at God's command complied. The bondwoman and her son went again into the desert, where they were almost spent with famine when an angel of God appeared and prophesied greatness for Ishmael, and God

showed Hagar a well of water (Gen. xxi. 1-21). This story of the relationship of Hagar to Sarah, of the birth of Ishmael, of Sarah's treatment of Hagar and her son, and of the final dismissal of the pair, is an admirable illustration of the manner in which tribal conditions are portrayed under the guise of history. Hagar personifies a tribe that at one time stood in close relationship to some of the Hebrew clans. Rivalry ensued, and the result was a separation, which is pictured as a dismissal on the part of the clan regarding itself as the superior. Interpreted in this way, the various features of it become clear. The opposition between Israelites and Ishmaelites leads the Hebrew writers to so construct genealogical traditions as to make Ishmael the son of the 'handmaid,' whereas Isaac is the offspring of the real wife, Sarai. As a justification for the separation of two nations having so much in common as Israel and Ishmael, it is represented (1) that Hagar, though the inferior, attempted to gain the supremacy, and (2) that Ishmael, the 'inferior' offspring, failed to recognize the superiority of Isaac. The separation, which no doubt was voluntary on the part of the Ishmaelites, is, therefore, portrayed as a deliberate act of dismissal on the part of Abraham, in whom the genealogical traditions of Hebrews and Arabs are thus made to unite.

The story of Hagar and Ishmael was well adapted for homiletical and allegorical elaboration, and hence both in the New Testament and in Rabbinical literature the subject is frequently introduced. Hagar is contrasted with Sarah allegorically by Saint Paul (Gal. iv. 22 sqq.), who makes Hagar, the bondwoman, represent the earthly Jerusalem, Sarah, who is free, the heavenly, and contrasts Ishmael and Isaac in a similar way. A Jewish tradition identifies Hagar with Abraham's second wife, Keturah (Gen. xxv. 1), and another makes her the daughter of Pharaoh. The Mohammedans look upon Hagar as Abraham's true wife and upon Ishmael as the favorite son. Consult: The commentaries on Genesis by Dillmann, Gunkel, Holzinger, and Delitzsch, and for further amplification of the Hagar-Ishmael tradition in Jewish and Mohammedan writings, Grünbaum, *Neue Beiträge zur semitischen Sagenkunde* (Berlin, 1901); Beer, *Das Leben Abrahams nach Auffassung der jüdischen Sage* (Leipzig, 1859); Weil, *Biblical Legends of the Mussulmans* (trans., London, 1846).

HAGAR, Stansbury (1869—). An American ethnologist and lawyer, born in San Francisco, Cal. He graduated at Yale in 1892, at the New York Law School in 1897, and became an investigator of native American archæology and ethnology. For this purpose he made studies in Peru, among the Cherokee Indians of North Carolina and the Micmacs of Nova Scotia, and in various European museums. He received election to the American Association for the Advancement of Science and to the vice-presidency of the American Folk-lore Society.

HA'GARTY, Sir John Hawkins (1816-1900). A Canadian judge, born in Dublin, Ireland, and educated at Trinity College. He emigrated to Canada in 1835, chose the law as his profession, soon attained a large practice, and in 1850 was made a Queen's Counsel. He was made a judge of the Court of Common Pleas in the Province of Ontario in 1856, a judge of the Court of Queen's Bench in 1862, Chief Justice of the Common Pleas in 1868, Chief Justice of the Queen's Bench in 1878, and president of the Court of Appeals and of the Supreme Court of Judicature, with the title of Chief Justice of Ontario, in 1884. He was knighted in 1897 on the occasion of Queen Victoria's diamond jubilee. Judge Hagarty was also a member of the law faculty of Trinity University, Toronto. He was a man of fine literary culture, and wrote some pamphlets and poems of considerable merit. As a criminal judge he was especially well known. He retired from the bench in 1897, and received on that occasion a highly appreciative address from the bench and bar of Ontario.

HAGBERG, häg'bĕrg, Carl August (1810-64). A Swedish writer on æsthetics and linguistics. He was born at Lund, studied at Upsala, where he became instructor of Greek in 1833, and, after two years in Germany and in France, where he became personally acquainted with Hugo and Lamartine, in 1840 was appointed professor of modern languages and of æsthetics at Lund. There he spent eleven years in the preparation of his excellent version of Shakespeare (1847-51); and on its publication was named a member of the Swedish Academy, a post in which he made great contributions to the lexicon of that body. Hagberg's later years were devoted to the study of old Norse dialects. In 1859 he was elected to a chair at Lund for instruction in Norse. Besides a sketch of modern French thought, *Om den nya fransyska vitterheten* (1837), Hagberg wrote little.

HAGBERRY. See Hackberry.

HAGDEN. See Shearwater.

HAGEDORN, hä'ge-dôrn, Friedrich von (1708-54). A German poet. He was born in Hamburg, studied jurisprudence in Jena, and was secretary to the Danish Minister at London in 1729-31. In 1733 he became secretary to the 'English Court,' a Hamburg trade association of English merchants. His poetry is of a varied character—sentimental, satirical, didactic—but all is marked by good taste and careful elaboration. He has been credited with originating the modern German *Gesellschaftslied*, or glee. Many of his *Lieder* were set to music by composers of the time. There is an edition of his works, with a biography and critique, prepared by Eschenburg (5 vols., 1800). Consult: Schuster, *Friedrich von Hagedorn und seine Bedeutung für die deutsche Litteratur* (Leipzig, 1882); Eigenbrodt, *Hagedorn und die Erzählung in Reimversen* (Berlin, 1884); and Witkowski, *Die Vorläufer der anakreontischen Dichtung und Friedrich von Hagedorn* (Leipzig, 1889).

HAGEN, hä'gen. The capital of the circle of the same name in the Prussian Province of Westphalia, situated on the Volme, 44 miles from Cologne (Map: Prussia, B 3). It is an important industrial centre and has a number of technical schools. Its chief manufactures are machinery and iron and copper products, railway and telegraph supplies, cotton goods, paper, tobacco, liquors, etc. There are electric street railways. Hagen is mentioned as early as the eleventh century, when it belonged to the Archbishop of Cologne. It received municipal rights from Friedrich Wilhelm I. of Prussia. Population, in 1890, 35,428; in 1900, 50,612.

HAGEN, or **HAGEN VON TRONEGE,** hä'gen fŏn tro'ne-ge. One of the most powerful creations of old German myth. His early life is spent as a hostage at the Court of Attila, from which he escapes with Gunther. He carries out Brunhild's vengeance by murdering Siegfried, and is finally captured by Dietrich von Bern and taken before Kriemhild, who slays him with Siegfried's sword when he refuses to disclose the Nibelungen treasure.

HAGEN, August (1797-1880). A German author. He was born and educated at Königsberg, Prussia, and became professor of the history of art and literature at the University of Königsberg, in which capacity he founded the art society and the city museum. His novel entitled *Norica* (6th ed. 1887; Eng. trans. 1851) treats of the art life of Nuremberg. His *Künstlergeschichten* (1833-40) are also justly celebrated.

HAGEN, Friedrich Heinrich von der (1780-1856). A German philologist, born at Schmiedeberg, and educated at Halle (1797-1800). In 1810 he became professor of German literature at the University of Berlin, then newly established. In the following year he was called to Breslau, and in 1821 was reinstalled at Berlin University, where he was four times dean of the philosophical faculty. He did much to stimulate interest in Germanic literature, though his critical methods have been superseded. His principal works include: *Erzählungen und Märchen* (2d ed. 1838); *Nordische Heldenromane* (1814-28); *Tausendundein Tag. Morgenländische Erzählungen* (1838); and *Ueber die ältesten Darstellungen der Faustsage* (1844).

HAGEN, Gotthilf (1797-1884). A German hydraulic engineer. He was born and educated at Königsberg, Prussia, and at first devoted himself to astronomy. In 1816, on behalf of the Berlin Academy of Sciences, he observed at Kulm the total eclipse of the sun, and in 1831 was appointed instructor at the Prussian Artillery and Engineering School, and also taught hydraulic engineering at the Academy of Architecture. He designed and directed the construction of the naval harbor at Wilhelmshafen, on the Jade estuary (completed 1869), and now one of the principal fortified naval stations on the North Sea. In 1869 he was appointed director-in-chief of the building department of Prussia. His principal publications are the following: *Handbuch der Wasserbaukunst* (1841-65), an exhaustive work which has passed through several editions; *Grundzüge der Wahrscheinlichkeitsrechnung* (3d ed. 1882); *Ueber Form und Stärke gewölbter Bogen* (2d ed. 1874); and *Ueber die gleichförmige Bewegung des Wassers* (1876).

HAGEN, Karl Gottfried (1749-1829). A German physician and apothecary, born at Königsberg, Prussia. He was appointed professor of medicine at the University of Königsberg in 1779, and professor of chemistry, physics, and natural history in 1807. His lectures, which he continued until his death, exercised a far-reaching influence. His best-known work is *Lehrbuch der Apothekerkunst* (8th ed. 1829).

HAGEN, Otto von (1817-80). A German forester, born at Usenburg, and educated at Berlin and at the Academy of Forestry in Eberswalde. In 1863 he was appointed chief of the Prussian department of forestry and curator of the Academy of Forestry at Eberswalde, and in 1868 was made curator of the Academy of Forestry at Münden. His principal work is entitled *Die forstlichen Verhältnisse Preussens* (3d ed. 1894).

HAGEN, Theodor (1842—). A German painter, born at Düsseldorf. He was the pupil of Andreas and Karl Müller at the Düsseldorf Academy, and afterwards of Oswald Achenbach. In 1871 he was appointed professor, and in 1877 director, of the art school at Weimar, but resigned both positions in 1880. At the exposition of 1891 in Berlin he was awarded a gold medal. His landscapes, which are in the manner of Ruysdael, include the following: "View of Kanderthal, Switzerland;" "A Storm;" "A Village in Spring;" "Saint Gothard;" "View of Scheveningen;" "View of Zons Near Düsseldorf" (Dresden Gallery).

HAGENAU, hä'ge-nou. Capital of the circle of the same name in Lower Alsace, Germany, situated on the Moder, 18 miles north of Strassburg (Map: Germany, B 4). It manufactures woolen yarn, chinaware, and beer. Hops are raised extensively in the vicinity. The town had its origin in a hunting seat belonging to the father of Frederick Barbarossa. It was strongly fortified by the latter, and in 1164 obtained a constitution and special privileges. It became a free town in 1257, and in the fourteenth century was at the head of the league of Alsatian free towns. By the Treaty of Westphalia, Hagenau passed to France, and its fortifications were destroyed in 1673. In 1871 it came into the possession of Germany. Population, in 1890, 14,752; in 1900, 17,968.

HAGENBACH, hä'gen-bäg, Karl Rudolf (1801-74). A German theologian. He was born March 4, 1801, at Basel, where his father was professor of anatomy and botany. After being professor extraordinary at Basel (1824), he became full professor in 1828. He lectured to public audiences, and afterwards published several courses of lectures on the nature and history of the Reformation, on the early history of the Church, and on the Church history of the eighteenth and nineteenth centuries, which were gathered into a collected edition (1869-72), and after his death edited by F. Nippold (Leipzig, 1885-87). The portion relating to the history of the Reformation in Germany and Switzerland was translated by E. Moore (Edinburgh, 1878-79), and that on the eighteenth and nineteenth centuries by J. F. Hurst (New York, 1869). Two other of his popular yet scholarly works have been translated—*A Text-Book of the History of Doctrine* (orig. Leipzig, 1840; 6th ed. by Benrath, 1888; trans. from the 5th ed., Edinburgh, 1880); and his *Theological Encyclopædia and Methodology* (orig. Leipzig, 1833; 12th ed. by Reischle, 1889; worked over by Crooks and Hurst, New York, 1884; new ed. 1891). He was an admired preacher (*Predigten*, Basel, 1858-75), and a poet (*Gedichte*, Basel, 1846). He edited the *Kirchenblatt für die reformierte Schweiz* (from 1845 to 1868); also the valuable series of biographies of the reformers of the Reformed Church, with selections from their writings (*Leben und Schriften der Väter und Begründer der reformierten Kirche*, Elberfeld, 1857-62, 10 vols.), to which he contributed the lives of Œcolampadius and Myconius (1859). He died in Basel, June 7, 1874. Consult his brief autobiography in *Erinnerungen an K. R. Hagen-*

bach (Basel, 1874); and the fuller sketch by Eppler (Gütersloh, 1875).

HAGENBACH, PETER VON (?-1474). Grand Bailly of Alsace. He was a soldier under Charles the Bold of Burgundy, who appointed him Grand Bailly of Alsace, where his cruelties caused general protest from the neighboring Swabian and Swiss communities, and may be said to have led to the war between Switzerland and Burgundy, which resulted in the complete ruin of Charles. Consult: Kirk, *History of Charles the Bold* (London, 1863-68), and Barante, *Histoire des ducs de Bourgogne* (Paris, 1824-26).

HAGENBECK, hä'gen-bĕk, KARL (1844—). A German trainer of animals and circus manager. He was born at Hamburg, where his father in 1852 established a considerable trade in animals. The business, which subsequently passed into the hands of the son, was greatly enlarged by him. In order to obtain animals from Africa and other countries, several transports were annually sent out from Hamburg. He later traveled through Europe, giving ethnological exhibitions representing the life of the various races of Africa, Oceanica, and of the far North. In 1886 he visited the United States, where he conceived the idea of organizing a circus. During the Chicago Exposition (1893) he revisited America, bringing with him about 1000 animals, including lions, tigers, bears, leopards, and wild boars. Hagenbeck has been styled 'the Moltke of menagerie-owners.'

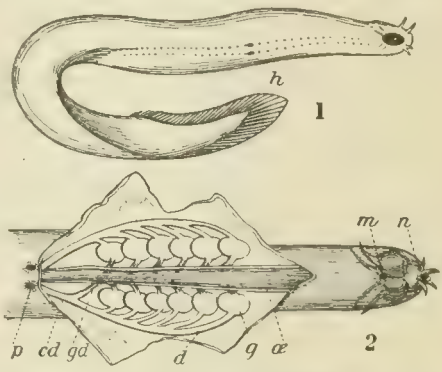
HA'GER, ALBERT DAVID (1817-88). An American geologist, born in Chester, Vt. Having obtained a common-school education, he was appointed assistant naturalist of Vermont in 1856, assistant State geologist under Edward Hitchcock from 1857 to 1861, State geologist from 1861 to 1870, and Vermont Commissioner to the Paris Exposition of 1867. From 1870 to 1877 he was State geologist of Missouri, and in the latter year was appointed librarian of the Chicago Historical Society. He published *Geology of Vermont* (2 vols., 1861, with Prof. Edward Hitchcock) and other reports of surveys in his native State and in Missouri.

HAGER, hä'gēr, HANS HERMANN JULIUS (1816-97). A German writer on pharmacy, born at Berlin. Both as editor of the *Pharmazeutische Centralhalle* at Berlin and as an author he did much to advance pharmaceutical science. His exposition and published analyses of secret remedies are especially valuable. His more important publications include: *Handbuch der pharmazeutischen Rezeptirkunst* (5th ed. 1890); *Manuale Pharmaceuticum* (vol. i., 6th ed. 1891; vol. ii., 3d ed. 1876); *Das Mikroskop und seine Anwendung* (7th ed. 1886).

HA'GERSTOWN. A city and the county-seat of Washington County, Md., 87 miles west by north of Baltimore; on the Baltimore and Ohio, the Cumberland Valley, the Norfolk and Western, and the Western Maryland railroads (Map: Maryland, G 2). It is the seat of Kee Mar College for women, opened in 1852, and has the Washington County Free Library. Hagerstown is of considerable commercial importance owing to its facilities as a railroad centre. The industrial establishments include machine-shops, flour and knitting mills, pipe-organ, cigar, match, furniture, and fertilizer factories; and agricultural implement, bicycle, spoke, and bending works. The city is governed under a charter of 1885, revised in 1895, which provides for a mayor, elected every two years, and a unicameral council. The electric-light plant is owned and operated by the municipality. Hagerstown was settled about 1740, and during the Civil War figured prominently as a base of operations. Population, in 1890, 10,118; in 1900, 13,591.

HA'GERSVILLE. A town and railway junction in Haldimand County, Ontario, Can., 25 miles southwest of Hamilton (Map: Ontario, C 4). Population, in 1891, 1061; in 1901, 1020.

HAGFISH, or **HAG** (ME. *hagge, hegge,* from AS. *hægtes,* witch, MDutch *haghetisse,* OHG. *hagazussa,* Ger. *Hexe,* hag, witch; apparently connected with provincial Eng. *hag,* AS. *haga,* Dutch *haag,* Ger. *Hag,* inclosure, coppice). Any of several species of roundmouths (see CYCLOSTOMI) that live parasitic upon fishes, and structurally are closely related to the lamprey (q.v.). They are eel-shaped in form and individuals of the genus Bdellostoma may reach a length of



HAGFISH (*Myxine glutinosa*).

1. Outline of the hag, showing the two ventral openings (*h*) by which the water escapes from the gills. 2. Anterior portion of the body laid open on the ventral side to show the branchial sacs. *æ*, gullet laid open, showing on each side the six apertures by which the water is conducted to the corresponding branchial pouches (*g*); *d*, one of the efferent ducts by which the water is conducted away from the branchial pouches; *cd*, common efferent duct on the left side, opening on the ventral surface by a branchial pore (*p*, or *h* of Fig. 1); *gd*, special canal developed on the left side only, and leading from the gullet into the common branchial duct; *n*, unpaired nostril, with its "barbels;" *m*, mouth.

three feet. The common hag or 'slime-eel' (*Myxine glutinosa*) may grow to be eighteen inches long, and is found on both coasts of the North Atlantic south to Cape Cod. The mouth is formed by a mere membranous ring with a single tooth on its upper part, while the tongue is furnished with two rows of strong teeth, and also performs the office of a piston in the use of the mouth as a sucker. Around the mouth are eight tentacles. The skin is smooth and capable of secreting an enormous amount of mucus. There is only a membranous caudal fin. The eyes are very rudimentary and sunk beneath the skin. The six gill-pouches empty separately internally into the pharynx, but externally by a single tube. There are no bones; the skeleton is membranous and cartilaginous. The eggs are large, are inclosed in a horny case, and bear hooked processes at each end for attachment to

weeds, etc. Myxine is hermaphroditic; the young animal produces sperms, and, later in life, ova. By means of the mouth the hags bore their way into the body of fishes, especially halibut and flounders, consuming them, leaving only the entrails, skeleton, and skin; hence another common name is 'borer.'

The hag on the west coast of America (*Polistotrema Stouti*) is hated by the fishermen, because of its destruction of fishes caught in nets, and its ugly appearance. It is about fourteen inches long. See Plate of LAMPREYS AND DOGFISH.

HAGGADA, hăg-gä′dä (Heb., narration, from *higgīd*, to narrate). The free rabbinical interpretation of Scripture, chiefly for homiletical purposes. Haggada is thus contrasted to *Halacha* (q.v.), 'rule,' which represents the authoritative interpretation of biblical laws for practical purposes. The Haggada developed side by side with the Halacha, and the two tendencies are found combined in the great compilation of rabbinical theology known as the *Talmud* (q.v.). But while the Haggadic sections in the Talmud are considerable, the great bulk of the Haggadic interpretation of the Old Testament is to be found in a number of separate compilations known as *Midrashim*. (See MIDRASH.) The oldest of these collections, adapted to the order of the biblical books, and in which the interpretations run parallel with the text, are: (1) The *Mechilta*, a collection of Haggadic interpretations to the Book of Exodus; (2) the *Siphra* to Leviticus; (3) *Siphre* to Numbers and Deuteronomy. Far more extensive, however, is the collection known as the *Midrash Rabbah*, or 'Great Midrash,' comprising the Haggada to the entire Pentateuch and to the five scrolls (read on the various festivals of the year), Esther, Ruth, Lamentations, Ecclesiastes, and Song of Songs. By the side of the compilation (concluded c.900 A.D.) may be mentioned the *Pesikta* to various sections of the Old Testament and the *Tanchuma* to the Pentateuch. On the basis of this Midrashic literature, a large number of works were produced through the Middle Ages to our own days, containing selections from the earlier compilations as well as additions and amplifications. Among these may be mentioned the *Midrash Hagadol*, 'the Great Midrash,' a Yemenitic compilation now being published by Dr. S. Schechter for the Cambridge University Press. *Haggada shel Pesach* is the name of a ritual, partly in Hebrew, partly in Aramaic, used on the first two evenings of the Passover, which contains, besides a brief description of the Exodus, extracts from the Scripture, the Mishna, Tosephta, Mechilta, Siphra, and the two Talmuds, and some liturgical pieces, all bearing more or less directly on the oppression in Egypt and the deliverance. Originally within very small compass, it has been extended to its present larger size by subsequent centuries. Two *Piutim*, or religious poems, were added in the eleventh century, and four more Hebrew and Aramaic songs (the last originally a German *Volkslied*) as late as the fourteenth century. Consult: Winter and Wünsche, *Die jüdische Litteratur* (Trier, 1894); Karpeles, *Geschichte der jüdischen Litteratur* (Berlin, 1886); Steinschneider, *Jewish Literature* (Eng. trans. London, 1857); Chenery, "Legends from the Midrash," in Loewy, *Miscellanies of Hebrew Literature* (London, 1877); Bacher, *Die Aggada der Tannaiten* (2 vols., Strassburg, 1884-90).

HAGGAI, hăg′gä-ī (probably 'born on a feast day,' though Haggai may also be an abbreviation of *Hagiah*, 'feast of Yahweh,' or for *Hagariah*, 'Yahweh hath girded'). A Hebrew prophet of the post-exilic period, and contemporary with the Prophet Zechariah, with whom he was associated (Ezra v. 1; I. Esdras vi. 1; vii. 3). He prophesied in Jerusalem after the return of the Israelites from the Babylonian captivity. The date of his work is fixed by his own writing (ch. i. 1, 15; ii. 1, 10) in the second year of Darius Hystaspes, B.C. 520. Concerning his own history nothing is known. The inference drawn from his work (ii. 3), that he had in his youth seen the former temple in its glory, may be correct, in which case the prophecies that we have from him would represent compositions produced in his old age. The Book of Haggai consists of four discourses, the delay in the rebuilding of the sanctuary furnishing the general motive. The prophet is represented as appearing before Zerubbabel and Joshua, the high priest, and strongly urging the reëstablishment of the sanctuary, pointing at the same time to the famine in the land as the divine punishment for the culpable neglect of the people, who only thought of their own houses, and not of that of God. His words made a deep impression, and the building was recommenced (ch. i.). The second discourse, about a month later, predicts a still greater glory for the new temple than had belonged to the former (ii. 3-9). Two months later he had to renew his reproaches against their inertness, and his promises of a blessed future (ii. 10-19). The fourth discourse (ii. 20-23), delivered on the same day, is directed to Zerubbabel, and, while foretelling great revolutions and political changes, promises that Zerubbabel shall remain a 'signet' in the hands of God—an implication apparently that Zerubbabel is to become the Messianic King. The style of Haggai is prosaic, and labors under an uncommon tameness and poverty of expression, principally apparent in the frequent repetition, within the short space of two chapters, of certain words and phrases, which could not well have been purposely retained for the sake of ornamentation. There is hardly any parallelism; but the prophet has endeavored to impart a certain vivacity to his writing by means of interrogation. The diction itself is, generally speaking, pure and clear. The contrast between Haggai and Zechariah, who have much in common, and the older prophets of the type of Jeremiah and Isaiah, is striking. Whereas the latter are concerned chiefly with ethical problems, the interest of the former is largely centred in the temple and the cult. They reflect in this respect the tendencies of the post-exilic period. Consult the general commentaries on the Minor Prophets (q.v.); Perowne, "Haggai and Zechariah," in the *Cambridge Bible for Schools and Colleges* (Cambridge, 1886).

HAG′GARD, HENRY RIDER (1856—). An English novelist, born at Bradenham Hall, Norfolk, and educated at the Ipswich Grammar School. He spent some time in South Africa (1875-79), where he became Master of the High Court in the Transvaal. On his return to England he practiced law. After two moderately successful experiments in fiction, he produced *King*

Solomon's Mines (1885), and *She* (1886), which won him instant fame by their imaginative power and novelty of scene. Among the novels which followed are *Jess* (1887); *Allan Quatermain* (1888); *Cleopatra* (1889); *Beatrice* (1890); *Eric Brighteyes* (1891); *Nada the Lily* (1892); *Montezuma's Daughter* (1894); *The People of the Mist* (1894); *Swallow: A Story of the Great Trek* (1899); *Elissa: A Zulu Idyll* (1900); and *Rural England* (1902). He also collaborated with Andrew Lang. All his work is crude in style and structure, but it possesses the merit of being readable.

HAGGENMACHER, hä'gen-mäg'ẽr, GUSTAV ADOLF (1845-75). A Swiss explorer of Africa, born on the island of Limmatau, near Brugg, Switzerland. In 1865 he went to Egypt and in the following year he settled at Khartum. Five years afterwards he proceeded to Suakin and thence to Massowah. In 1872 he was the commissioner of Egypt at the World's Fair, Vienna, where his exhibition of Sudanese products attracted general attention. In 1874 he was appointed the representative of Consul Munzinger at Cassala, whence, by order of the Khedive, he undertook a tour through Somaliland. In the following year he proceeded as far as Galabat. He accompanied Munzinger during the campaign against the Galla tribe, taking with him his wife and two children. On the return journey the family were murdered by the natives.

HAGHE, hăg, LOUIS (1806-85). A lithographer and water-color painter. He was born at Tournay, in Belgium, March 17, 1806. His right hand being deformed from birth, he drew with the left. At the age of seventeen he made drawings for De Jonghe's "Vues pittoresques de la Belgique," and soon afterwards went to England. At London he formed a partnership with William Day, producing a series of lithographic works of the highest merit. Among these were Vivian's "Spanish Scenery," Atkinson's "Views in Afghanistan," his Robert's "Sketches in the Holy Land, Syria, Idumea, Arabia, Egypt, and Nubia," and lithographs of his own drawings of old Flemish interiors. Subsequently he devoted himself to painting in water-colors and became a leading member of the association formed to promote this branch of art, and was president from 1873 till 1884. Haghe displayed a predilection for old Flemish interiors, but also painted Italian subjects and scenes from English history. Among his pictures may be mentioned the "Council of War at Courtray" (1854), in the National Gallery, and the "Audience Chamber at Bruges," which are remarkable for their harmony of color, fidelity in detail, and richness of architecture. He exhibited "The Night Watch" at the Philadelphia Exposition in 1876. There are good examples of his work in the South Kensington, British, and Bethnal Green museums. He obtained the gold medal for lithography at Paris in 1834, and a second-class medal for water-color at the Exposition of 1855; and was a member of the Belgian and Antwerp academies. He died at Stockwell Green, Brixton, March 9, 1885.

HAGI, hä'gê. A town in the Japanese Prefecture of Yamaguchi, situated on the eastern coast of Nippon, near the southern end of the island (Map: Japan, B 6). In feudal times it was the residence of the Daimios of Choshu and played a prominent part in the abolition of feudalism. Population, about 20,000.

HA'GIOG'RAPHA. See BIBLE.

HAGN, häg'n, LUDWIG VON (1820-98). A German genre painter, born in Munich. He was educated at the military school there, but preferred the life of an artist to that of a soldier, and studied in Berlin and Antwerp, lived in Paris for ten years (1853-63) and in Italy for two, but returned to his native city in 1868. His paintings include: "Unwelcome Wooing" (1851, Schwerin Gallery); "Musical Morning Entertainment" (1859, Pinakothek, Munich); "Italian Garden Scene" (1868, Schack Gallery, Munich); "Library of the Jesuit College in Rome" (1869). His later work depicted an "Audience with Pope Leo XIII." (1880), and a "Corpus Christi Procession in the Seventeenth Century," for the Munich City Hall (1881).

HAGONOY, ä'gô-nō'ê. A town of Luzon, Philippines, in the Province of Bulacan, founded in 1581. It lies about 13 miles northwest of Bulacan and about six miles north of Manila Bay. Population, in 1898, 20,120.

HA'GOOD, JOHNSON (1829-98). An American soldier, born at Barnwell, S. C. He graduated in 1847 at the South Carolina Military Academy, and at the outbreak of the Civil War became colonel of the First South Carolina Volunteers. In 1862 he was made a brigadier-general in the Confederate Army. He served on the South Carolina coast, and commanded at Battery Wagner. At the siege of Petersburg he commanded a brigade in the trenches, and subsequently he fought at Weldon Road, in the operations north of James River and at Fort Fisher.

HAGUE, hăg, THE (Dutch *'s Gravenhage*, the count's hedge). The seat of the Government of the Netherlands and residence of the sovereign, pleasantly situated in the Province of South Holland, about 15 miles northwest of Rotterdam and three miles from the North Sea (Map: Netherlands, C 2). It is intersected in all directions by canals and shaded avenues of linden trees, and is famed above all other Dutch cities for its broad, handsome streets, palaces, Government and municipal buildings, and stately houses. Of these edifices the picturesque town hall is the most interesting from an architectural standpoint. The most notable church is the Groote Kerk, or Church of Saint James, a Gothic structure of the fifteenth and sixteenth centuries, with a lofty hexagonal tower. The palace of justice is a handsome building in the Dutch Renaissance style. In the Mauritshuis, rebuilt in 1704, is located the renowned picture gallery, containing about 450 canvases, largely of the best Dutch period, and especially rich in Rembrandts. Among the most celebrated pictures are Rembrandt's "School of Anatomy" and "Presentation in the Temple," Ruysdael's "View of Haarlem," Paul Potter's well-known "Bull," and Rubens's "Portrait of Ophovius." The municipal museum and the house of Baron Steengracht also have fine collections of paintings, the former containing corporation pieces by Ravesteyn.

The royal library possesses 500,000 volumes and a valuable collection of more than 40,000 coins and medals, and over 300 cameos. In the centre of Willems-Park rises the magnificent national monument commemorating the restoration

of Dutch independence in 1813. It was unveiled in 1869 and is surmounted by the "Nederlandsche Maagd"—the virgin personification of Holland. Other monuments are the equestrian statue of William I. of Orange before the royal palace, and the bronze figure of Spinoza, erected opposite the house in which he lived. Still other museums and monuments merit attention.

The Government buildings are handsome, and their archives include State papers over four centuries old. From an historic point of view the most interesting buildings of The Hague are the Gevangenpoort, or the prison gatehouse in which Oldenbarnevelt, the brothers De Witt, and many others distinguished in the history of Holland were confined; and the Binnenhof, in which Oldenbarnevelt was executed, and which, together with the Buitenhof, forms an irregular mass of public buildings of various ages, inclosed by moats and approached by drawbridges. These edifices are situated in the wealthy central quarter of the town around the attractive Vyver (fish pound)—an ornamental lake, with an island. The fish market is one of the most interesting in Europe. The suburbs are particularly beautiful with their meadows, gardens, woods, and villas. The so-called zoölogical and botanical garden is almost exclusively a pleasure park, and a fine road and five tramways lead to the celebrated watering place of Scheveningen on the coast. The far-famed royal villa of Huis ten Bosch (The House in the Wood), situated on the outskirts of the city in the midst of a noble and much frequented park-forest (het Haagsche Bosch), has costly and dainty apartments filled with fine art objects and rare examples of interior decoration, including tapestries, embroideries, and grisailles. The Orange Room, an octagonal hall decorated with paintings by Jordaens and others, especially attracts the visitor.

The city is provided with good educational institutions, comprising public schools, a gymnasium, a drawing school, the Royal School of Music, and an educational institute of the Free Masons. There are many learned societies, the most notable being The Hague Society for the Defense of the Christian Religion, founded in 1785. Others are the Witte Society, the Physics Society, the artists' association called Pulchri Studio, and the Netherland-India Institute. The Hague is a residential city, conspicuous for fashionable life. Its prosperity depends chiefly on the Court and nobility and on the throngs of foreigners that visit the city and Scheveningen. The manufactures are neither important nor varied, consisting chiefly of articles of luxury, such as gold and silver work and porcelain. There are some gun-casting and brass and copper molding; and carriages and furniture are also manufactured. But little trade is carried on. The city is the starting-point of the railway system of Holland, and has steam and electric trams. The Hague, like other Dutch towns, has increased rapidly in population. The figures were 81,393 in 1863; 174,790 in 1894; and 212,211 in 1900 (including Scheveningen). Two-thirds of the inhabitants are Protestants. The death-rate is low—less than 17 per 1000.

The Hague was originally a hunting seat of the counts of Holland. Under William II. (1250) it became a princely residence, and prospered thereafter to such an extent as to become, in the sixteenth century, the seat of the States-General and of the Stadtholder of Holland. In the seventeenth and eighteenth centuries The Hague was the diplomatic capital of Europe. Here were concluded the triple alliance of England, Sweden, and the Netherlands against France (1668), and the triple alliance of England, France, and Holland for the preservation of the Treaty of Utrecht (1717). Between May 18 and July 29, 1899, the city was the seat of the Hague Peace Conference (q.v.). Curiously enough, The Hague possessed no municipal rights till the time of Louis Bonaparte, having remained for centuries the most magnificent 'village' in Europe.

HAGUE, Arnold (1840—). An American geologist, born in Boston. He graduated in 1863 at the Sheffield Scientific School of Yale, studied at Göttingen, Heidelberg, and the Freiberg School of Mines, and in 1867 was appointed assistant geologist of the United States Geological Exploration of the Fortieth Parallel. From 1877 to 1878 he was Government geologist of Guatemala, and from 1878 to 1879 Government agent for the examination of mines in Northern China. He was appointed a geologist of the United States Geological Survey in 1879, and in 1883 was assigned to the Yellowstone Park division. He was elected a member of the National Academy of Sciences in 1885. His publications include: *The Volcanoes of California, Oregon, and Washington Territory* (1883); *The Volcanic Rocks of the Great Basin* (1884); *The Volcanic Rocks of Salvador* (1886); *Geology of the Eureka District* (1892); and *Geology of the Yellowstone National Park* (1899).

HAGUE, George (1825—). A Canadian banker, born at Rotherham, Yorkshire, England, where he was also educated. He emigrated to Canada in 1854, and was for twenty years in the employ of the Bank of Toronto (1856-76), but afterwards became general manager of the Merchants' Bank. He was first president of the Canadian Bankers' Association and of the Montreal Good Government Association, a governor of McGill University, and of the Montreal Diocesan College. He gave liberally to many charitable institutions. Several of his papers on banking and kindred subjects have been published, besides his *Personal Reminiscences of the Late E. H. King* (1896).

HAGUE PEACE CONFERENCE. An international conference of delegates which assembled at The Hague on May 18, 1899, in response to an invitation addressed by the Czar of Russia to the principal States of the civilized world, with a view to concerted action for the maintenance of a general peace and the amelioration of the hardships of war, and with a view to the possible reduction of the military and naval armaments of the world. One hundred delegates, representing the United States, Mexico, China, Japan, Persia, Siam, and twenty-one European powers were present. Italy objected to any representation of the Papacy, and Great Britain protested against the representation of the Transvaal Republic. It was accordingly decided to restrict participation in the Conference to States maintaining standing armies or navies. No delegates from the Central or South American republics attended. The Conference was in session from May 18 to July 29, and was presided

over by Baron de Staal of the Russian delegation. For the purpose of facilitating the work of the Conference, three grand committees were formed, dealing respectively with armaments and engines of destruction, humane regulations in warfare, and mediation and arbitration. Each of the Great Powers was represented on all of the committees, and the delegation of each State had one vote on every proposal submitted to the Conference. The conclusions of the Conference were embodied in a final act signed July 29, by all the States represented. This act consists of three treaties or conventions, three formal declarations, and six resolutions. The first convention relates to the pacific adjustment of international disputes. The second deals with the laws and usages of war on land. The third provides for the adaptation of the rules of maritime warfare to the principles of the Geneva Convention of 1864. The three declarations involve the prohibition (1) of the use of projectiles or explosives from balloons for a period of five years (accepted unanimously); (2) of the employment of projectiles which diffuse asphyxiating or other deleterious gases (not accepted by England and the United States); and (3) of the use of bullets which expand or flatten easily in the human body. In the six resolutions the Conference expresses the opinion that the limitation of the military burdens which now weigh so heavily upon the world is greatly to be desired for the enhancement of the moral and material well-being of humanity (unanimously agreed to); that the questions relating to the rights and duties of neutrals, the inviolability of private property in maritime warfare, and the question of the bombardment of towns, should be referred to a future conference; and that the questions relating to types and calibres of marine artillery and small arms and the size of military and naval budgets should be studied by the governments of the signatory powers with a view to establishing uniformity in the former and reduction in the latter.

Of all the conclusions reached by the Conference the convention relating to mediation and arbitration aroused the most general interest. According to this convention, the signatory powers agree to resort to mediation in cases of serious international dispute, and a method of procedure is provided by which mediation may be arranged at the instance of the disputants or by the voluntary offer of neutral powers. It further provides that mediatory advances shall never be considered by the disputing parties as an unfriendly act. With a view to the adjustment of international differences where neither 'honor' nor 'essential interests' are involved, a commission of inquiry is provided for, whose duty it shall be to examine controverted questions of fact such as are susceptible of judicial ascertainment, and report the result of its inquiries to the disputing powers for their acceptance or rejection. Finally, with a view to the settlement of disputes between States by arbitration, a Permanent Court of Arbitration was created. This tribunal is composed of persons eminent for their knowledge of international law, and chosen by the parties concerned from a permanent list of arbitrators nominated by the signatory powers. Each power is allowed to nominate not more than four members, and their term of office is six years. In order to constitute the court for a particular case, each party to the controversy chooses two arbitrators either from the list of permanent members or from persons who are not members, and these choose an umpire. There are also detailed provisions for selecting an umpire in case the two arbitrators cannot agree, for regulating the procedure of the court, for reviewing its decision, etc. The diplomatic agents of the signatory powers resident at The Hague, under the presidency of the Dutch Minister of Foreign Affairs, constitute a permanent Council which serves as the office of the Permanent Court of Arbitration. The first resort to the Permanent Court of Arbitration was made by the United States and Mexico in 1902 for the settlement of the controversy in regard to the Pius Fund Claims. The delegates from the United States to the Conference were Andrew D. White, Seth Low, Captain A. T. Mahan, Captain William Crozier, Stanford Newell, and Frederick W. Holls, the secretary of the delegation. Consult: Davis, *Elements of International Law* (New York, 1900); and Holls, *The Peace Conference at The Hague* (New York, 1900).

HAHN, hän, August (1792-1863). A German Protestant theologian. He was born at Grossosterhausen, Saxony, March 27, 1792; studied at Leipzig, and in 1819 was appointed professor extraordinary of theology at Königsberg. In 1826 he removed as professor of theology to Leipzig, where he came into great prominence as the author of a treatise, *De rationalismi, qui dicitur, vera indole et qua cum naturalismo contineatur ratione*, and also of an *Offene Erklärung an die evangelische Kirche zunächst in Sachsen und Preussen*, in which he endeavored to convince the rationalists that it was their duty voluntarily and at once to withdraw from the National Church. In 1833 Hahn was called to Breslau as theological professor and consistorial councilor, and in 1844 he became general superintendent of the Province of Silesia. Among the other literary labors by which he is best known are his edition of the Hebrew Bible (1831), and his *Bibliothek der Symbole und Glaubensregeln der apostolisch-katholischen Kirche* (Breslau, 1842, 2d ed. by G. L. Hahn, 1878). He died at Breslau, May 13, 1863.

HAHN, Friedrich von (1823-97). A German jurist, born in Homburg. After study at Jena and Heidelberg, he became a lecturer at the former in 1847, and professor in 1850. In the conferences held at Nuremberg and Hamburg in connection with a general code of commercial law for Germany, he took a prominent part. He was appointed to the Court of Appeal at Jena in 1862, and to the Imperial Supreme Court at Leipzig in 1879. From 1891 until his retirement in 1893 he was president of the Senate of the Supreme Court. His chief publication is his *Kommentar zum allgemeinen deutschen Handelsgesetzbuch* (Brunswick, vol. i., 4th ed. 1894; vol. ii., 2d ed. 1875-83).

HAHN, Johann Michael (1758-1819). A Swabian theosophist, founder of the Michelians. He was born at Altdorf, and had visions at the age of seventeen, and again in his twentieth and twenty-second years. After the last of these he began to proclaim his beliefs both by writing and by speech, and gained many followers. But

neither he nor they became separatists. In 1782 he traveled to Switzerland and met Lavater, Pfenninger, and Jung-Stilling. Unlike most of the visionaries of his country, Hahn held that regeneration was a slow growth. His views were largely tinged with the teachings of Böhme and of Oetinger. He held the belief in a double fall of man; the mystic belief that the work of Christ is not merely for, but within man; and the millennial view of the second advent, and of the final beatitude of all souls, even of the fallen angels. His works were published posthumously at Tübingen (1819 sqq.). Consult: Palmer, *Die Gemeinschaften und Sekten Württembergs* (Freiburg, 1877); and Staudenmeyer, *Michael Hahn* (Wilferdingen, 1893).

HAHN, Ludwig (1820-88). A German historian, born at Breslau, and educated there and at Berlin. After several years of service as school officer at Stralsund, he became chief counselor of the Government in the literary bureau, and retired in 1883. He wrote: *Das Unterrichtswesen in Frankreich* (1848); the very popular *Geschichte des preussischen Vaterlands* (24th ed. 1895) and *Leitfaden der vaterländischen Geschichte* (49th ed. 1896); *Friedrich der Grosse* (2d ed. 1865); *Kurfürst Friedrich I. von Brandenburg* (1859); *Zwei Jahre preussisch-deutscher Politik, 1866-67* (1868); *Der Krieg Deutschlands gegen Frankreich* (1871); *Kaiser Wilhelms Gedenkbuch* (5th ed. 1880); *Fürst Bismarck*, a collection of speeches, State papers, letters, etc., of the Chancellor (1878-91, the last volume by Wippermann); *Zwanzig Jahre 1862-82*, a study of Bismarck's influence (1882); and *Wilhelm, der erste Kaiser des neuen deutschen Reichs* (1888).

HÄHNEL, hā′-nel, Ernst (1811-91). A German sculptor, born at Dresden. He studied architecture there and, from 1830, at Munich. Under the influence of Schwanthaler and Rietschel, he turned his attention to sculpture, which he also studied at Rome. In 1825 he returned to Munich. In 1838, through the architect Semper, he received a commission to supply sculptures for the Royal Theatre of Dresden. The most important of these, a frieze representing a "Bacchanalian Procession," was destroyed when the theatre was burned, but survives in plaster cast, and the statues of Sophocles, Aristophanes, Shakespeare, and Molière were saved and used on the new building. For the Dresden Museum he executed many reliefs and six statues in sandstone, the most famous being a Raphael, of which there are marble replicas in the National Gallery, Berlin, and the Leipzig Museum. His best known works include a bronze statue of Beethoven at Bonn (1845), the colossal statue of Charles IV. at Prague (1848), the bronze image of Frederick Augustus II. at Dresden (1867), and Field-Marshal Schwarzenberg at Vienna (1867). For Leipzig he executed a bronze statue of Leibnitz (1883) and a group, "Eve Protecting Abel from Cain"; for the Vienna Opera house five ideal statues; and the two admirable Pegasus groups. Although Hähnel's tendencies were classical, his portrait statues and busts evince high power of characterization. His art represents a transition from the classical to the romantic school. As professor at the Dresden Academy, he had many pupils. His works have been published in photographic reproduction (Dresden, 1882-87).

HAHNEMANN, hä′ne-mân, Samuel (1755-1843). The founder of homœopathy. He was born at Meissen, Saxony, the son of a painter of Dresden china. After obtaining a primary education with difficulty, at the age of twenty he left Meissen, with 20 crowns as his fortune, and went to Leipzig, to prosecute his medical studies. Here he maintained himself by translating works from Latin, French, and English into German. Two years later he went to Vienna, where, under the direction of Dr. Quarin, he pursued his studies, but a year afterwards was obliged to seek funds through employment as physician and librarian at Hermanstadt. He was graduated in medicine from the University of Erlangen in 1779. Subsequently he retired to Saxony, and settled in Dresden in the year 1784. His attention at this time was given to the study of toxicology of arsenic and of mercury. After spending four years in Dresden, where he had for a time the direction of a large hospital, he returned in the year 1789 to Leipzig. In the following year, while translating Cullen's *Materia Medica* from English into German, he became interested in the similarity of the effects of quinine and some other drugs upon the healthy body with the result of certain diseases for which these drugs are used. In other words, he discovered, independently, Hippocrates's old 'law of similars.' With intense interest he searched medical literature for confirmation of his belief in a new principle of cure which he at once began to advocate, namely, that drugs which produce certain symptoms in the healthy body will cure a disease which exhibits similar symptoms. In *Hufeland's Journal*, in 1796, he published his first important paper, entitled, "An Attempt to find a New Principle for the Discovery of the Healing Power of Medicine, with Observations on Existing Methods." About 1800 he promulgated the principle of 'potentization' or 'dynamization' of drugs, by trituration of minute amounts of dry drugs with inert material, or dilution and vigorous shaking of minute quantities of liquid drugs, claiming for such preparations increased strength from the new arrangement of molecules. 'Dynamization,' he claimed, imparted a spirit-like force to the dose. In 1810 Hahnemann published his *Organon der rationellen Heilkunde*, which was translated into many languages, and in which he expounded his new system, which he called *homœopathy*. Between 1810 and 1821 he published, at Leipzig, his *Materia Medica*, under the name *Reine Arzneimittellehre*, in six volumes. In this work he set forth his observations of the effects of drugs upon healthy people. About the same time he founded at Leipzig a school which soon attracted students from all over the country. In 1828, in his work on chronic diseases, written at Köthen, he discussed the disease known as the itch, and reached the conclusion that all diseases are modifications of the itch. The discovery that the itch insect, *Sarcoptes scabiei* (*Acarus scabiei*), is the cause of scabies beyond a doubt, caused a change in the belief of homœopathists all over the world, and an abandonment of what had been called the first principle of homœopathy.

As Hahnemann's system involved the administration of medicines each separately by itself and in minute doses, there was no longer any need of the apothecary's intervention between the physician and the patient. In consequence of this, the apothecaries' company brought to bear

upon Hahnemann an act forbidding physicians to dispense their own medicines, and with such effect that he was obliged to leave Leipzig. The Duke of Anhalt-Köthen appointed him his physician, and invited him to live at Köthen. Thither, accordingly, he removed in the year 1821, and there he prepared various new editions of his *Organon* and new volumes of his *Materia Medica* for publication. In 1835 he left Köthen, and settled in Paris, where he enjoyed a great reputation till his death, which took place in the year 1843. On the centenary of his birth in 1855, a statue was erected to his honor at Leipzig, at the expense of his disciples in Germany, France, England, and other countries, with the concurrence of the local authorities, who supplied the site in one of the public places in their handsome town. His principal work, besides those already mentioned, is *Fragmenta de Viribus Medicamentorum* (1805). Consult his *Life and Letters*, by Bradford (Philadelphia, 1895). See HOMŒOPATHY.

HAHN-HAHN, hän'hän, IDA, Countess von (1805-80). A German novelist, born at Tressow. Her unhappy married life and divorce (1829) are reflected in her *Ulrich* (1841) and *Zwei Frauen* (1845), written under the influence of the emancipatory ferment of Gutzkow, Laube, and Heine, and the early novels of George Sand. She became a Roman Catholic in 1850, wrote several proselytizing books, became a novice (1852), founded a convent at Mainz, and died there. Her clever but superficial talent had great though passing vogue, during which several of her books were translated into English. For her life, consult: Marie Helene (Leipzig, 1869); Haffner (Frankfort, 1880); and Alinde Jacoby (Mainz, 1894).

HAHNKE, hän'ke, WILHELM VON (1833—). A German soldier, born in Berlin. He received his military training as a member of the Prussian cadet corps, entered the Prussian Army in 1851, and in 1866 was on the staff of the Crown Prince, Frederick William, during the campaign in Bohemia. During the Franco-Prussian War he was a major on the general staff, in the headquarters of the Crown Prince, and by 1881 had risen to be major-general, commanding the first brigade of infantry guards. In 1890 he became general of infantry, from 1888 to 1901 was chief of the military cabinet, and in 1899 was appointed commander-in-chief in the Marches and governor of Berlin. He also received an appointment as adjutant-general to the Emperor.

HAIDA, hī'dä. A remarkable group of tribes constituting the Skittagetan linguistic family, formerly occupying the thirty-nine villages on the Queen Charlotte Islands, British Columbia. They are a seafaring people, traveling and fishing in large canoes, hewn from logs of cedar, carved with symbolic figures. The women are skillful in weaving mats and baskets in twined work, and the men in carving from black slates miniature figures of their totemic designs, totem-posts, house-fronts, and articles of daily use. They were a warlike race, and extended their raids along the coast as far as the mouth of the Columbia River. Their houses are built of cedar planks hewn out, and in front of each immense totem-poles have carved on them the heraldic emblems of the family dwelling within. Women and men tattoo their bodies and wear labrets. The contact with civilization has reduced the population from 7000, in 1840, to 600, living in Masset and Skidegate villages.

HAIDARABAD, hī'dēr-ä-bäd'. A native State and a city of British India. See HYDERABAD.

HAIDEE, hī-dē'. A Greek girl in Byron's *Don Juan*.

HAIDINGER, hī'dīng-ēr, WILHELM VON (1795-1871). An Austrian mineralogist and geologist. He was born at Vienna, and studied with Mohs at Gratz and at Freiburg. After living for a time in Edinburgh, he returned to Austria, where he was interested with his brother in a porcelain factory at Elbogen. In 1840 he was appointed to take charge of the Imperial Mineralogical Collections, and a few years later he commenced his lectures on mineralogy. In 1849 he was chosen as the director of the newly founded Geological Institute, and in 1865 he was knighted. He published many books on mineralogy and crystallography, but is best known perhaps for the discovery of the phenomenon known as *Haidinger's brush*, by means of which plane polarized light can be detected. This consists of a pale-yellow brush with curved arcs on either side, shaped like the branches of a hyperbola. The plane of polarization coincides with the axis of the brush, and on either side there is a violet or bluish patch. This phenomenon is supposed to be caused by the polarizing structure of the eye. While in Edinburgh, Haidinger translated Mohs's *Grundriss der Mineralogie*, and then published it in enlarged and improved form under the title of *Treatise on Mineralogy* (3 vols., 1825). He is the author of *Handbuch der bestimmenden Mineralogie* (1845), and supervised the construction of a geological map of the Austrian Empire (1845).

HAIDUKS, hī'dụks (Hung. *hajdu*, drover, plural *hajduk*). A term formerly applied among the Balkan Slavs to the bandit mountaineers, who, like the Greek *klephts*, were generally Christians and opposed to Turkish rule. Such bands —each one having a chief—the *haram basha*— were found among the Serbs and Bulgarians from the beginning of Turkish rule. Some of their chiefs became distinguished as partisan leaders. Those who killed Turks only were regarded by their people as patriots rather than as bandits. They were popular heroes, and did much to bring on the final struggle for independence. In Hungary this designation was applied to a class of mercenary foot-soldiers. As a reward for their services in the struggle against the Hapsburgs, Stephen Bocskay, Prince of Transylvania, granted them, in 1605, the privileges of nobility, and a large stretch of territory as their own possession. The Haiduk district remained independent of the local authorities, and under the direct administration of the national Government, until after the Revolution of 1848. Haiduks adopted Calvinistic Protestantism early in the Reformation. In 1876 this district was incorporated with portions of two adjoining districts into a new administrative division known as the Haiduk County, with Debreczin for its capital. In Hungary and Poland the term is also applied to the domestics of the great houses. In France in the eighteenth century it was given to the outriders of the carriages of the rich. These outriders wore Hungarian costumes and carried swords

until prohibited by royal ordinance, in 1779, from bearing this mark of military rank. Consult Rosen, *Die Balkanhaiduken* (Leipzig, 1878).

HAIL (AS. *hagol*, Icel. *hagl*, OHG. *hagal*, Ger. *Hagel*, hail; probably connected with Gk. κάχληξ, *kachlēx*, pebble). Round, compact masses of ice that fall from the clouds to the earth, usually with rain. When these masses are as large as one-quarter of an inch in diameter or larger they are often spoken of as hailstones; when they are quite small and perhaps accompanied by rain they are known as sleet. Hailstones occur of all sizes from a quarter of an inch in diameter up to three inches in diameter; usually comparatively few hailstones fall at any one place, but cases are recorded in which the ground has been covered to a depth of several inches, and all vegetable life destroyed. The larger hailstones have a rather complex structure, being mostly composed of concentric layers of solid transparent ice and snowy-white or soft ice. In most cases the larger stones have a nucleus, which is either a foreign substance, such as a bit of gravel or a small pebble, or some larger object, such as those that are carried up from the earth by tornadic winds; or the centre is composed of a mass of snow, in whose interstices is held some gas, presumably air or oxygen, powerfully compressed within the central cavity. When this cavity is opened under water the inclosed gas is seen to expand, and, according to Jaentr, the gas seems to be held therein under a pressure of as much as fifty atmospheres.

The external surface of a hailstone is sometimes of beautiful regularity, as though it had grown by accretion of small particles during a slow and steady motion through the atmosphere, but this regularity is quite rare. More frequently the larger stones are irregular aggregations of masses of ice; of course, however, such masses may have their shapes greatly altered when they strike the ground. The largest stones whose records are trustworthy have not exceeded two pounds in weight. Stones of two and three inches in diameter, weighing twelve and sixteen ounces, occur annually in Europe, India, and America. See the *Monthly Weather Review* for August, 1878.

A hail-storm is usually characterized by the formation of very high cumulus clouds, strong surface winds, considerable lightning and thunder, and heavy rain. It appears possible that hail may be formed either in the front of an advancing cool wave or in connection with a local thunder-storm or tornado. The former gives us the smaller hail and sleet; the latter gives us the larger and destructive hailstones. In the latter case it is quite common for the area of destructive hail to cover long, narrow strips of country as though it belonged on one side of the path of progression of some special cloud or vortex.

Protection against hail has been sought from time immemorial by different methods characterized by the gradual progress of our knowledge as to how hail is formed. In most ancient days the church bells were rung and the saints invoked. The lightning-rod is called *paragrêle* in France, but there is no evidence that it protects from hail. In recent years the belief and practice of the peasants of Styria and Northern Italy has spread through Austria and Southern France to the effect that a special form of cannonading may, by bombarding the clouds, prevent hail, the theory being that if hail is formed by a process of crystallization in still air, then the cannonading by disturbing the stillness would prevent the hail. But all these ideas are delusions, and the bombardment has no appreciable effect upon the hail-storms. The most rational method of counteracting the injury done by hail is by adopting a method of hail insurance by which the losses of a few persons are distributed among many. The total amount of damage done by hail and lightning is summed up statistically in the annual reports of the Chief of the Weather Bureau and in the special reports in the *Monthly Weather Review*. In the United States in 1899 there were 563 persons killed and property valued at $4,000,000(?) was destroyed.

The method of formation of hail is as yet but little understood. It seems to be demonstrated that when a rising mass of air cools to the dew-point and below, it begins to form a cloud; as it continues to ascend, it cools to a temperature where hail is formed or rather hail and rain simultaneously. Higher than this it cools to a temperature where snow is formed. The ordinary hail may be formed in the second region, but the large hailstones of complex structure must have been carried up and down many times from the rain region to the snow region forward and backward until they become too large and heavy to be held up any longer. In accordance with these ideas it is found that a very large proportion of the destructive hail occurs between ten A.M. and four P.M., and a very small proportion between 6 P.M. and 8 A.M. See Von Bezold, *Thermodynamics of the Atmosphere* (originally published at Berlin, 1888 and 1889; translated in full in Abbe, *Mechanics of the Earth*, Washington, 1891); Ferrel, *Recent Advances in Meteorology* (Washington, 1886).

In the *Monthly Weather Review* for September, 1900, is given a table showing the annual frequency of hail-storms for a unit area of one hundred miles square, as derived from the records of each State in the Union. This table is as follows:

Alabama	3.96	Nebraska	5.78
Arizona	1.99	Nevada	2.62
Arkansas	5.08	New Hampshire	2.68
California	2.54	New Mexico	1.98
Colorado	5.92	New York	6.30
Florida	2.10	North Carolina	5.22
Georgia	3.39	North Dakota	3.82
Idaho	4.26	Ohio	10.74
Illinois	8.44	Oklahoma	3.74
Indiana	9.84	Oregon	4.30
Indian Territory	2.58	Pennsylvania	6.18
Iowa	8.44	South Carolina	5.72
Kansas	6.28	South Dakota	4.06
Kentucky	7.16	Tennessee	5.70
Louisiana	5.04	Texas	1.44
Maine	1.84	Utah	3.06
Michigan	5.64	Vermont	6.40
Minnesota	4.48	Virginia	6.36
Mississippi	4.62	West Virginia	7.94
Missouri	8.78	Wisconsin	6.28
Montana	1.78	Wyoming	1.16

In addition to the preceding, records made in the States of Connecticut, Rhode Island, Massachusetts, Maryland, Delaware, and in the District of Columbia, may be summed up into one average—i.e. 3.0 per cent.

HAIL COLUMBIA. A song written in 1798 by Joseph Hopkinson for the benefit of a young

actor, and sung to the tune of the *President's March* (1788), composed by Fyles in honor of President Washington. Though not of a high order, it appealed to the popular taste, and continues to maintain its position as one of the representative patriotic songs of the United States.

HAILES, Lord. A Scottish judge and writer. See Dalrymple.

HAI'LEYBURY COLLEGE. An English public school situated at Hailey, Hertfordshire, nineteen miles north of London. This school is often called New Haileybury, in distinction from the older and more famous school which it succeeded. Old Haileybury, or more properly the East India College, was a training-school for young men entering the service of the East India Company. It was founded by the Company in 1806, and occupying first Hertford Castle, moved to the building erected for it at Hailey by Wilkins, in 1809. Here it carried on its work till, after a career of almost exactly half a century, it ceased to exist, January 31, 1858. During that time many of the most distinguished men connected with Indian history and administration were members of the college. Among the professors are to be found the names of Malthus, the political economist; Sir James Stephen, Sir James Mackintosh, and William Empson, master of the college and later editor of the *Edinburgh Review*. Lord Lawrence, Sir Bartle Frere, Sir Charles Trevelyan, Sir William Muir, John Muir, Dean Merivale, Sir Richard Temple, and Sir M. Monier-Williams may be instanced among its students. The great days of the school seem to have been in the principalship of Dr. Batten, 1815-37, when many of those most famous in the Mutiny days were in Haileybury. It was indeed in that trying time that the value of the school and its training was best seen, and the proud tradition of the school is the part its men took in the suppression of that rising. Its importance rests on even broader grounds than this. In the influence it has had on Indian administration by its spirit and traditions; in the model which it set for the training of men for both Indian and colonial service, now carried on elsewhere; in the impetus it gave to Oriental studies in England, as well as in the vigorous and varied intellectual life it enjoyed during the greater part of its career—the East India College deserves a high place among English educational forces of the nineteenth century. The fall of the East India Company after the Sepoy Mutiny brought with it the suspension of its great training-school. The Indian Civil Service was reorganized under Government control, and the training of men for that service fell into other hands. For some four years the buildings at Haileybury stood vacant.

New Haileybury. Owing to the exertions of certain gentlemen of Hertfordshire, chief among whom was the publisher Stephen Austin of Hertford, a sum was subscribed to buy the estate and found a public school on the premises. This was accordingly done, and the school was incorporated by royal charter, and was opened in September, 1862, as Haileybury College. This foundation, beginning with an enrollment of some fifty scholars, was successful from the start. The estate has increased from the original 55 acres of the East India College to nearly double that area; the number of students has grown to nearly 600, and many new and handsome buildings have been added to the great quadrangle of the old school. Of that earlier foundation more has been inherited by the new than the estate and buildings; for while it is no longer a training-school for the Indian service, much of the old atmosphere and tradition remains, giving it a tone and character which mark it off to some extent from other schools. For the East India College, consult Monier-Williams, *Memorials of Old Haileybury College* (Westminster, 1894); for the new school, consult handbooks of Public Schools. A. L. Lowell, *Colonial Civil Service* (New York, 1900), devotes more than 100 pages to Haileybury College to show its value in securing good and fit men for colonial offices.

HAILLAN, ī'ăn', Bernard de Girard (c.1535-1610). A French historian, born in Bordeaux. He occupied a number of political offices before Charles IX. appointed him historiographer of France, in which position he was confirmed by Henry III., who liked him so well, despite his vanity and selfishness, that he made him genealogist of the Order of the Holy Ghost, and gave him a pension of 1200 crowns. His chief work is *L'histoire générale des rois de France jusqu'à Charles VII. inclusivement* (1576), which ran through many editions.

HAILMANN, hāl'mǎn, William Nicholas (1836—). An American educator, born in the Canton of Glarus, Switzerland. He studied in the gymnasium at Zurich, Switzerland, and with a tutor, and in 1855 entered the Medical College at Louisville, Ky. He taught in the Louisville High School from 1856 to 1865; was director of the German and English Academy at Louisville from 1865 to 1873, of the German and English Academy at Milwaukee from 1873 to 1878, and of the German-American Seminary at Detroit from 1878 to 1883, when he became superintendent of public schools at La Porte, Ind., a position which he held until 1894. From 1894 to 1898 he was the National Superintendent of Indian Schools, and in 1898 was appointed superintendent of instruction at Dayton, Ohio. His publications, many of which are on educational subjects, include: *Outlines of a System of Object Teaching* (1866); *History of Pedagogy* (1870); *Kindergarten Culture* (1872); *Letters to a Mother* (1876); *Early Education* (1878); *Primary Helps* (1884); *Primary Methods* (1887); *Application of Psychology to Teaching* (1887); and *Place and Development of Purpose in Education* (1899). He also translated Froebel, *The Education of Man* (1890); and edited the *Erziehungsblätter* (1870-83) and *The Kindergarten Messenger and New Education* (1876-83).

HAIL TO THE CHIEF. The boat song occurring in the second canto of Scott's "Lady of the Lake." The air, by Sir Henry Rowley Bishop, is frequently played on public occasions to announce the approach of a person of prominence.

HAILTZUK, hīl'tsuk. A group of tribes of Wakashan stock, occupying the coast islands of British Columbia from Gardner Channel to Rivers Inlet. In language and customs they are almost identical with their neighbors and kinsmen, the Kwakiutl (q.v.).

HAIMBURG, him'boorg. See Hainburg.

HAIMO, or **HAYMO**, hī′mō (c.778-853). An Anglo-Saxon ecclesiastic, Bishop of Halberstadt. He was a friend and fellow student of Hrabanus Maurus, who dedicated his *De Universo* to him. A monk at Fulda, Haimo taught at Hersfeld, and in 840 became Bishop of Halberstadt. He was scholarly and spiritual, fond of allegory and mysticism. His works are published under the designation "Haymon Halberstatensis," in vols. cxvi.-cxviii. of Migne, *Patrologia Latina* (Paris, 1844).

HAIMONSKINDER, hī′mŏns-kĭn′dĕr. A popular German romance which appeared at Cologne in 1604 under the title *Ein schöne und lustige Histori von den vier Heymonskindern.* It was largely an adaptation of a version current in the Netherlands and based on a French original. A previous German adaptation (1535) was based directly on the prose romance *Les quatre fils Aymon.* See AYMON.

HAIM′SUCKEN, or **HAMESUCKEN** (from AS. *hām*, Goth. *haims*, OHG. *heim*, Ger. *Heim*, home + AS. *sacu*, contention, guilt, lawsuit, from AS., Goth. *sacan*, OHG. *sahhan*, to contend). A Scotch law term, denoting the offense of feloniously assaulting a man in his own house or lodgings. This was an aggravation of the ordinary offense of assault. It was not so in England, where there is no peculiar name to distinguish this from other assaults. The term was, however, employed in English law to describe the offenses comprehended under the term housebreaking. See BURGLARY.

HAINAN, hī-nän′. A large island in the China Sea, situated south of China and forming a department of the Chinese Province of Kwangtung (Map: China, D 8). Its area is estimated at 13,600 square miles. It is separated from the mainland by Hainan Strait, 10 miles wide. There are several densely wooded mountain chains in the interior. The coasts are level and well watered, and the chief rivers are navigable for flat boats. The flora is very rich, and includes the areca-palm, cocoanut-tree, the banana-tree, and various other tropical plants. Among the fauna are the tiger, the rhinoceros, and several species of monkey. The climate is hot, but somewhat tempered on the coast by the wind. The chief products are sugar-cane, cotton, tobacco, cocoanuts, and cocoanut products. The population of the island is estimated at 2,500,000, consisting partly of Chinese who immigrated to the island during the eighteenth and nineteenth centuries, and the aborigines. The latter resemble somewhat the Malays, and are of small stature, and far from prepossessing in appearance. They are mostly savage in their mode of life, and have retained some independence. The capital is the treaty port of Kiungchow (q.v.).

HAINAULT, or **HAINAUT**, ā′nō′ (Flem. *Henegouwen*). A western province of Belgium, lying southeast of Flanders (Map: Belgium, B 4). Its area is 1437 square miles. The province may be said to belong to the region of the Ardennes, and is well watered by the Scheldt, the Sambre, and their tributaries. The canals are numerous. The soil is very fertile, and agriculture flourishes. Wheat, flax, and fruits are principally grown. Horse-breeding is an important industry. Hainault is very rich in coal deposits, yielding about three-fourths of the total output of Belgium. Over 96,000 people are employed in the coal-mines. Iron, marble, and plaster are also exported, and the production of pig iron, steel, and glass is extensive. The textile manufactures are likewise well developed. Nearly one-half of the population are occupied industrially. The inhabitants numbered 807,467 in 1895, and 1,146,646 in 1900. The capital is Mons. Hainault was a county in the latter part of the Middle Ages. Together with the County of Holland, it was made over to Burgundy by Countess Jacqueline in 1433. Subsequently it shared the fortunes of the Belgian Netherlands. Portions of it were annexed to France in the seventeenth century.

HAINBURG, hīn′bōōrk, or **HAIMBURG**. An ancient town in Lower Austria, situated on the right bank of the Danube, 26 miles east-southeast of Vienna (Map: Austria, E 2). It is surrounded by old walls, and abounds in Roman antiquities. It is supplied with water by an ancient aqueduct, and the Rathaus contains a Roman altar. The old ruined castle is identified with the Castle of Heimburc, mentioned in the *Nibelungen* as the border fortress of the Huns. Outside of the town lie the ruins of the Castle of Rottenstein. Hainburg has one of the largest State tobacco-factories of Austria and a needle-factory. It lies near the site of the ancient Carnuntum. The town was destroyed by Matthias Corvinus in 1482, and by the Turks in 1683, when most of the inhabitants were killed. Population, in 1900, 6225.

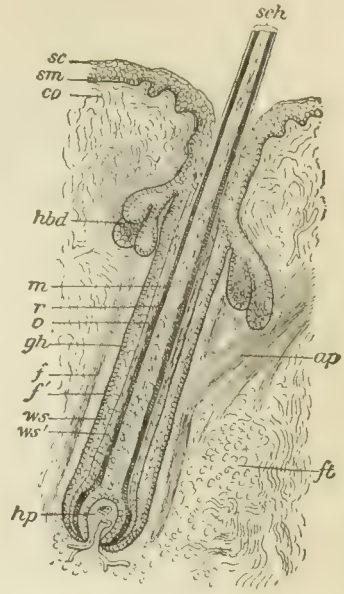
HAINES, or **HAYNES**, JOSEPH (?-1701). An English actor and writer. After completing his studies at Queen's College, Oxford, he was, for a time, secretary to one of the ministers of State, but was soon dismissed because of his indiscretion, and then became a dancer on the stage. He played Benito in the *Assignation*, a part which it is supposed Dryden wrote expressly for him, but his fame rests principally upon his ability in reciting prologues and epilogues, many of which were from his own pen.

HAIPHONG, hī′fŏng′. The chief port of Tongking, opened in 1876 to foreign residence and trade under a treaty made by the French with the King of Annam (Map: French Indo-China, E 2). It is situated on the right bank of the Kua-Kam, a branch of the Songkoi or 'Red River,' at a point where a canal leads out of it at right angles toward the Songkoi. It is the port of Hanoi, the capital of Tongking, distant 145 miles by water, but only 60 in a direct line. The town lies on both sides of the canal, in the midst of a rice-swamp. The native town consists of houses of mud, bamboo, or matting. Previous to the arrival of the French there was scarcely a hut. On the other side of the canal is the 'Concession,' or French settlement, with fine wide streets lined on both sides with trees and lighted with electricity, a fine boulevard, good houses, spacious warehouses, extensive shops, many pleasant bungalows, and a hotel, all erected on swampy land filled in with mud dug from the creek which surrounds it. The city is connected with Saigon by cable. Haiphong is the highest point to which vessels drawing 14 feet can ascend. In 1897 the population was 18,400, including 5500 Chinese and 900 Europeans. Most of the trade,

amounting in 1899 to 5,250,000 taels, is with Hong Kong. A railway to Hanoi was opened in February, 1901.

HAIR (AS. *hǣr*, Icel., OHG. *hâr*, Ger. *Haar;* probably connected with OChurch Slav. *kosmā*, Lith. *kasa*, hair, and perhaps with Lat. *carere*, to card wool). The characteristic covering of mammals, an epidermal outgrowth, the formation and structure of which are quite different from either scales or feathers. Hairs are not entirely wanting in any mammals, though they vary greatly in abundance, some animals being completely and densely clothed in them, while others possess them only on limited parts of the surface, as in man, and others, as adult whales, have only a few bristles near the mouth. Hairs of two distinct kinds occur in many mammals, one of which is stiff, straight, and smooth, the other curly, soft, and often minutely rough. It is this roughness of the outer surface which makes the processes of felting and skinning possible. When both kinds of hairs are present, the soft ones, usually called 'wool,' are much more abundant than the straight ones; but the latter give the smooth outer coat to the body and are therefore sometimes called 'contour' hairs. Unlike feathers, hairs are uniformly distributed over the body, except in special cases, where particular regions are left bare. Hairs vary greatly in size and color; the longest hairs occur among the ungulates, especially in the tails of such species as the horse, while the shortest hairs of any mammal are usually on the face. The color of hairs depends upon the amount of pigment they contain, the amount of air in the intercellular spaces, and the character of the external surface.

Hairs arise as outgrowths of the epidermis and contain no dermal tissue. The original epidermal thickening pushes down into the dermis as a solid hair-germ, around which the dermis forms a hair-follicle. The hair-germ soon differentiates into two distinct parts, a peripheral and a central. The former gives rise to the external root-sheath and becomes the inner, epidermal coat of the hair-follicle, from the outer dermal portion of which it is separated by the so-called hyaline layer. The central part of the hair-germ gives rise to the hair-shaft itself and to the inner root-sheath, which closely invests the base of the shaft. The latter consists of a central medulla or pith, a cortex, and an outer cuticle; the pith is made up of a loose, dry tissue with large intercellular spaces filled with air; the cortex is a dense layer containing the pigment; the cuticle is the covering of the hair, and may be smooth, or more or less rough, and ornamented with scales and other projections. At the base of the shaft and inclosed by the swollen or bulbous base is the hair-papilla, which is well supplied with blood-vessels, and thus furnishes the nourishment necessary for the growth of the hair. When a hair is shed, a new hair may arise in the same follicle from a new hair-papilla. Each hair-follicle is provided with nerves, smooth muscles, and sebaceous glands, the latter keeping the hair oiled. By means of the muscles (arrectores pili) the hairs can be moved independently, but the movement of large numbers of hairs in unison is accomplished by the movements of the striped muscles of the skin. Sensations of cold, or of fear, cause an involuntary contraction of these muscles in man, causing the feeling of an erection of the hair on the head in terror, or 'gooseflesh' in cold. In the lower animals this effect is produced by ill health. Horsemen have a very graphic expression for it, saying of the coat of an animal out of condition, that it 'stares.'



GROWTH OF A HAIR.

Diagrammatic longitudinal section through the 'root' of a hair. *sc*, Stratum corneum; *sm*, stratum Malpighii; *co*, derma; *ap*, arrectores pili; *ft*, adipose tissue; *f*, outer longitudinal layer, and *f'*, inner transverse layer, of dermic coat (both composed of connective tissue); *sch*, hair-shaft; *m*, medulla; *r*, cortex; *o*, cuticle of shaft; *ws*, external root sheath; *ws'*, internal root-sheath, which reaches above only as far as the point of entrance of the ducts of the sebaceous glands; *hbd*, sebaceous glands; *hp*, hair-papillæ containing vessels; *gh*, hyaline layer which lies between the inner and outer hair-sheaths, i.e. between the root-sheath and the follicle. (Wiedersheim.)

An infant's hair is shed soon after birth, and replaced by a new covering. The short downy hairs on the human body are rudimentary remains of complete hairy covering in ancestors of the race. Loss and repair appear to go on continuously up to a certain time, when baldness occurs with the majority. Each hair is said to live from two to four years. The grayness of hair in advanced life results from a deficient secretion of pigment and perhaps an increase of air in the medulla of the hair. Well-authenticated cases are on record in which the hair has grown gray or white in a single night, from the influence of fear, distress, or any variety of strong mental excitement.

With respect to the quantity of hair that grows on the human body, there are great differences in different races. The Mongols, and other northern Asiatics who are similar to them, are noted for the deficiency of their hair and for scanty beards, and the same character is ascribed to all the American Indians; while on the other hand, among the Ainos of Japan, or in the Kurilian race, there are individuals who have hair growing down the back, and covering nearly the whole body. The Northern Asiatics and the American Indians have generally straight, lank

hair, while Europeans have it sometimes straight and flowing, and occasionally curled and crisp. Negroes present every possible gradation from a completely crisp or what is termed woolly hair, to merely curled and even flowing hair; and a similar observation holds regarding the natives of the islands in the great Southern Ocean.

The length to which the hair of the head may grow normally, especially in women, is very considerable. A North American Indian of the Crow tribe is said to have had hair that was ten feet seven inches in length. About 1878 there was exhibited in New York City a family of Russians who were almost covered with long hair. Their foreheads, noses, and cheeks were so shaggy that their eyes could scarcely be seen, and their ears were concealed by the hair that grew from them. Cases occasionally occur where there is an abnormal abundance of hair of considerable length in women, on parts where the hair is usually little more than down. A well-known case is that of Julia Pastrana, whose ears and all parts of the face except the eyes were covered with hair of different lengths. The beard was tolerably thick, the hairs composing it being straight, black, and bristly, the part of it which grew on the sides of the chin hanging down like two plaits. The upper portion of the back of the neck and the hinder surface of the ears were covered with hairs. On the shoulders and legs the hairs were as abundant as they are occasionally seen on very powerful men. See BEARD; WIG.

On the other hand, there may be a deficiency or even entire absence of hair. The effect may be more or less general or localized, and may be either congenital or acquired. It is stated that about 90 per cent. of cases of baldness (q.v.) are due to seborrhœa, which causes an excess of dandruff. This widespread affection is due to bacterial infection. The symptoms consist in the presence of small grayish-white greasy scales, falling of the hair, and more or less itching, with usually a red scalp. The primary site of the disease is, in most cases, the scalp; not infrequently, however, it extends to the face, chest, and back (seborrhœal eczema). Unless treatment is instituted, the disease results in permanent baldness, by interfering with the nutrition of the hair and by destroying the roots and papillæ of the hair. Seborrhœa is communicable, and therefore the use in common of combs and hair-brushes should be discouraged. The treatment consists in avoiding much water as well as avoiding frequent shampooing, and the local application of sulphur, carbolic acid, chloral, resorcin, some salt of mercury, or some other parasiticide, either in the form of an ointment or a lotion.

The services of hair in animal economy are various, though there is reason to believe that the primary use was the maintenance of a uniform body temperature by preventing loss of heat by radiation. Hair is an excellent non-conductor of heat, especially in the form of wool, and we thus find wool best developed in those mammals which are natives of cold regions. Its warmth-conserving quality is largely due to the air entangled among it. The widespread use among men of the skins of mammals in the form of furs is ample evidence of their value as non-conductors. An important service to man is performed by the hair about the lips and nose in keeping dust and deleterious particles from entering the nostrils and mouth, while the beard forms a protection to the throat and chest against chilling changes of temperature. In the form of bristles and spines, which are simply excessively stiff hairs, hair often serves a protective purpose, as in the hedgehog and porcupine. In other cases the hair becomes fused with dermal plates, and helps to form a defensive armor, as in the armadillo and pangolin. And finally in entering into the composition of some horns, as in the rhinoceros, hair reaches the extreme of its defensive uses. In many animals, notably the cats, hairs may become organs of touch of great sensitiveness, especially in the region of the mouth. Such hairs, known as vibrissæ, are supplied with special nerves to fit them properly for their purpose. Whether claws and hoofs are to be regarded as modified hair is still an unsettled question. For chemical composition, see table under HORN. Consult: Walsh, *The Hair and Its Diseases* (London, 1902); Wiedersheim, *Comparative Anatomy of Vertebrates* (New York, 1886).

HAIR (in plants). See TRICHOME.

HAIR, DISEASES OF THE. See HAIR; BALDNESS.

HAIRBIRD. A local name in the Eastern United States for the chipping sparrow (*Spizella socialis*), in reference to the fact that its nest is now made almost entirely of horse-hairs. See SPARROW.

HAIRCLOTH. A fabric of horsehair, woven on a warp of cotton, linen, or worsted, and formerly much used in upholstering furniture. The long hair from horses' tails is chosen for the purpose. The hair is drawn, straightened, and assorted, then woven on power-looms, which in their general appearance, though not in their method of working, resemble the ordinary cotton or woolen cloth looms. At the close of the nineteenth century this material was little used for upholstery, but was extensively employed by tailors and dressmakers as a stiffening fabric for interlinings, its superiority to other materials used for the purpose being that it is unaffected by moisture. Haircloth is also employed for sieves for expressing oils, etc.

HAIRDRESSING. This has always formed an important part of costume. The most ancient monuments of art show coverings for the head which must certainly be wigs, and others in which there is doubt whether the natural hair, worn long and elaborately curled and crimped, or an artificial imitation of it is intended. Hairdressing is sometimes entirely decorative in intention, and sometimes has a traditional character intended to convey an idea of personal dignity, of having attained a certain age, of a certain rank in the community, of bravery as a warrior or the like, as the curious ring worn by the Zulu warriors, in which, according to the most exact accounts, the short curling hair is, in a circle as large as the top of the head allows, stiffened with gum in such a way that it stands up in a very visible coronet. It is not unlike the tonsure or partial shaving of the head common in many lands, which in the form used by the Roman Catholic clergy is familiar to us. The tonsure used by the Greek Church differs very much from that in the Latin or Roman Catholic Church. It is noticeable that the head, as the most prominent part of the body and the part which cannot be

concealed, is selected to bear these unmistakable marks, and the wearing of this permanent crown may be compared with the coronets, garlands, wreaths, and crowns in the usual sense which, although of temporary use, are equally significant as indicating a rank or a state of being.

HAIRDRESSING IN ANCIENT TIMES. The Egyptian hairdressing, as shown in the painted bas-reliefs and flat paintings, was extremely varied. It was divided into many tresses, each thickly plaited, or in two very broad and flat braids, one on each side of the head, while the hair behind is cut short; or in long parallel braids of great number, which are again grouped in masses, one mass falling in front of the shoulder on either side and the larger mass behind. Wigs were evidently very common. Among the Greeks the statues and bas-reliefs which we have of the sixth century B.C. and before show a very elaborate style of dressing the hair common to both men and women. The heads even of athletes show the hair crimped and curled, retained by a broad band, in front of and below which the little curls are arranged in corkscrews, or in curls made spiral at the end and fixed close to the forehead, evidently retained by some very tenacious cosmetic. One most beautiful headdress of which the date can be nearly fixed is that of the Apollo in the eastern pediment of the Temple of Zeus at Olympia. The hair, radiating in all directions from the crown of the head, is generally rippled; it is retained by a band above the ears and falls below this band in short, curling locks parted so as to leave the ear free. At the same epoch, however, namely about B.C. 450, the portrait statues, or those which may seem to be so, have the hair in a less elaborate style, worn naturally as in many heads of both old and young men of the great period of Greek art, and the heads of women of the same periods have the hair not very long and gathered at the nape of the neck or retained by a broad fillet, a stephane, or the like, and falling on the neck, but not below the shoulders. In the fourth century B.C. and later the headdress of men becomes less and less a matter of moment. The hair is worn in its natural curls or cut very short, and it is evidently the purpose of the sculptor to insist upon the form of the head, which the hair is not allowed to conceal. At the same time the headdress of women becomes suddenly more and more elaborate. Among the Roman hairdressers, this Greek tendency continues. The typical head of a man of family has short-cut hair and no beard except for a few years under the Antonines, while the headdress of women, though charmingly simple and natural, and setting off the head well during the years of the later Republic and the early Empire, is shown as extremely fantastic in the busts and medals of women of the Imperial Court.

EGYPTIAN HAIRDRESSING.

HAIRDRESSING IN LATER TIMES. The disposition to use the hair, when worn long, as a vehicle for elaborate design of some kind never seems to disappear. As the Roman ladies twisted the hair over their forehead into the appearance of an immense sponge, the taste recurs after the simpler conditions of the Middle Ages in the fourteenth century, when men and women alike, of the wealthier classes, had most elaborate coiffures, sometimes wrought into a glossy ring two or three inches in diameter reaching diagonally from above the forehead, touching the ears and to the nape of the neck, or in two great puffs concealing the ears, or, in the case of women, combined with a broad cushion or coronet at the top, which seems to be supported by a great volume of crimped and curled hair below. The well-known portraits of Henry IV. (died 1610) and his minister, the Duc de Sully, show this fashion carried into later times. The beard is shown combed out and curled with great nicety, gummed in a radiating form like a fan below and on both sides of the lower lip, and the mustache in like manner is curled and rolled upward from the mouth, the whole evidently held in place by some glutinous medium. The hair, when abundant, is also rolled back from the forehead and temples in a way which is very effective and reminds one of the 'Pompadour' style of hairdressing which has been in fashion for women during several epochs since.

FIFTEENTH CENTURY.
(The Netherlands.)

The elaborate dressing of the hair reached its culmination under the reigns immediately succeeding that of Henry IV. Thus, during the boyhood of Louis XIV., and in England during the reign of Charles I., the long hair, perfumed and carefully adjusted, was not allowed to blow freely in the wind, but was tied with ribbons into long and heavy locks. The fact that the King, Louis XIV., had unusually long and abundant hair seems to have been the main cause of the introduction of long curled wigs, by means of which his courtiers thought to ape the natural gifts of their master.

SIXTEENTH CENTURY.
(England.)

The use of perukes was well established by 1650, and from that time for at least a century there was no such thing as hairdressing for men. The coiffure of women during the early part of this time was extremely tasteful and well adapted to the head and face, varying as it did very largely, according to the age, complexion, and stature of the wearer. The curling hair lying on the neck and bare shoulders and covered by a crêpe veil which we associate with the simpler dress of court ladies and the costume of the richer bourgeoisie from 1640 to 1670 is followed by, or alternates with, lighter and shorter curls which seem to blow in the wind. Toward the close of

the seventeenth century the tall headdresses of lace and starched cambric begin to come in, but these are mere modifications of the veil, and the hair is not very elaborately dressed, being gracefully combined with the loose cap which covers the back of the head and arranged in ringlets around the forehead and cheeks, while the stiff, upright, fan-like plaits of the 'tower' tend rather to elongate the head and increase the apparent stature than to form in themselves a mere headdress. In the reign of Louis XV., with all the fantastic elaboration of costume, the enormous panier or expanded skirt, the loose sleeves and collar and the rest, the head is generally dressed very simply and it is obviously the purpose of the whole toilet to make the head seem very small in proportion. With the close of this reign and the beginning of the reign of Louis XVI. the return is gradual to more fantastic forms, and by 1750 a huge edifice of curls stiffened with wire, as well as haircloth and the like, was arranged to carry a little cap or hat entirely removed from the scalp and adorned with feathers and flowers. It is probable that hairdressing in the proper sense has never been so rich and fantastical as at this time. As the reign of Louis XVI. drew on toward the Revolution this headdress of women grew still more fantastic, and we read of one in which a model of a ship of war was carried in the place of the hat upon this structure of curls and crinoline. These extravagances were gradually abated, and in the nineteenth century the hairdressing of men was much less elaborate, as the hair was uniformly worn short. In the first part of the century women dressed their hair very simply, letting it fall at the sides in a series of ringlets, and gathering it around the back of the head with a ribbon. Somewhat later the side curls were done away with, and the hair was arranged on the top of the head with elaborate and fantastic headdresses and much use of false hair. *Chignon* was the word used to describe the hair when it was dressed in a large roll, especially when it was arranged over a cushion, or other support. From about 1850 curls again became popular for a time, and since their disuse no marked innovation has been introduced in the matter of hairdressing. Consult: Villermont, *Histoire de la coiffure féminine* (Paris, 1892), a most comprehensive treatment of the subject; Child, *Wimples and Crisping Pins* (New York, 1895), a popular historical sketch of hairdressing; Wollensack, *Der Damenfriseur* (Stuttgart, 1897).

1750 (England).

HAIR-DYE. A substance employed for changing the natural color of the hair to a preferred one, and for hiding the approaches of age as indicated by the presence of gray hairs. Usual methods consist in washing the hair with a solution of some metallic salt known to have the effect of darkening its color. These are the salts or oxides of silver, mercury, lead, and bismuth. Peroxide of hydrogen is used to produce a golden tint. The most perfect mode of dyeing the hair, however, is that of previously preparing it by a complete soaking with a solution of sulphide of potassium. The strength of this solution must depend on the depth of tint intended to be given; the stronger the solution the darker the color will be. When thoroughly wetted the hair is allowed to dry partially; and while still damp it is to be again thoroughly wetted with a solution of nitrate of silver, also proportioned in strength by the same rule as in the case of the solution first applied. This makes a very permanent dye, which only requires renewing as the new growth of hair becomes conspicuous. The fashion of dyeing the hair is very ancient, and belongs as much to savage as to civilized nations, but in the case of the former vegetable dyes have been chiefly used; the ladies of China and other Eastern countries also resort to the same, the juice of the petals of *Hibiscus Trionum* and probably other species of hibiscus being in general use with them. Many hair-dyes cause disease; some kill the hair, and it assumes the appearance of mouse-fur. The practice is rarely justifiable, and almost invariably results in a loss of the esteem and respect of others.

The detection of stained hair is sometimes an object of medico-legal investigation. Lead may be detected by boiling the hair in dilute nitric acid, and then applying the tests for lead (q.v.) to the acid solution; while the presence of silver may be shown by digesting the hair in dilute hydrochloric acid or chlorine water, when the resulting chloride of silver may be dissolved out with a solution of ammonia, and submitted to the ordinary tests for silver (q.v.).

HAIR-EEL. See HAIRWORM.

HAIR-GRASS (so called from the slender form). A genus of grasses, the members of which have loosely panicled flowers, and two unequal glumes which contain two perfect florets. The species are natives of temperate and cold climates. The tufted hair-grass, or turfy hair-grass (*Deschampsia cæspitosa*), common in most pastures and meadows of Middle and Northern Europe, is a beautiful grass when in flower, but forms coarse tufts two to four feet high. It has very rough leaves, which, if drawn quickly across the hand, inflict considerable wounds, whence the plant sometimes receives the name of 'cutting grass.' If other herbage is within reach, cattle reject it. It is sometimes used for thatching ricks of hay or grain, and in some places for making mats. Soils upon which it grows luxuriantly usually need draining. It is sometimes tolerated, in order to add to the bulk of marsh or bog hay, but is carefully eradicated wherever agricultural improvements take place. For its extirpation, drainage is requisite above all things; but the digging out of the tufts is also practiced, and other grasses are sown instead. This grass is, however, sometimes sown to form cover for game, particularly hares; and in marshy situations, for snipes and wild fowl. It is the 'windlestrae' of the Scotch.

HAIRLESS DOG. Races of dogs whose skins are almost completely devoid of hair have been known since ancient times, and in widely separated parts of the world. The Chinese have a variety which they cook and eat as a delicacy. This Oriental hairless dog is of a small greyhound-terrier type, mostly entirely destitute of hair. One variety has a few straggling hairs on

the body and a tuft at the tip of the tail. In East India the mountaineers of Coimbaton use a dog they call the 'polygar' in the chase of the bear and wild boar, which is wholly destitute of hair. It is fierce and unmanageable except by its keeper, and in this respect differs from all other known hairless dogs. In Central Africa there is a naked dog of greyhound type, about 14 inches tall and with a slender body about 22 inches long, and much retracted in the flanks. A few hairs are found near its tail, around the mouth, and on the legs. Its skin is black. Rengger gives reasons for believing that when America was discovered by Europeans a hairless dog was domesticated, which was distinct from the hairless dog found preserved in the ancient Peruvian burial-places, described by Tschudi under the name of 'Inca dog.' Other hairless dogs exist in the Philippine Islands, the Antilles, and the Bahamas. A large naked dog is figured by Clavigero as one of the indigenous animals of ancient Mexico. In the native language it was called by a name translated into 'servant dog.' The small edible dogs of the Mexicans, which the Spaniards spoke of as 'very tender and delicate food,' undoubtedly were the puppies of this breed. Their Indian equivalent title was 'sucker,' because, doubtless, they were taken from their mother to be eaten before they had ceased to nurse.

Hairless dogs, called 'Mexican hairless,' are often shown in the pet-dog classes at the dog shows. They are very like shaved black and tan terriers, but lack the keen eye of that dog. They are mostly of a blue or brownish color, entirely devoid of hair except a few straggling single ones here and there on the body and tail, and sometimes a small tuft on the head. The skin, as a rule, is wrinkled, and generally harsh to the touch.

HAIR MANUFACTURES. The difference between hair and wool is that the surface of the former is smooth and hard, while the latter is covered with little projections so that it can be felted easily. The hair of animals is woven into fabrics, made into brushes, and used as a stuffing for upholstery. *Horsehair* is woven into hair-cloth (q.v.). It is also twisted into thick yarn, and woven into sacking in the ordinary way, in Anatolia and Rumelia. *Cow-hair* is used in large quantities by masons to bind plastering together. It is also worked up into a rough yarn, and is woven into carpets in Germany; and in Norway is made into socks by the peasants. *Pig's hair* is similarly employed in China; and among the natives of the Hudson's Bay Territories dog's hair is used for the same purpose. The *goat's hair* of Tibet and Persia, and the *camel's hair* used in weaving, belong rather to the true wools, and will be treated of under Wool. The shorter kinds of horsehair from the manes and tails, also cow-hair and the softer kinds of pig-hair, are twisted into ropes, which, after being boiled and then thoroughly dried in an oven, are pulled to pieces. The hair retains the twist given it, and is then used for stuffing seats of chairs, etc.

Brushes of Hair are of various kinds; some are made of the stiff hairs from the backs of pigs, and others are made of the soft hair of the camel and other animals. The hairs for the first kind are usually called bristles. They are chiefly used in the manufacture of hair and clothes brushes, tooth and nail brushes, house-sweeping brooms, the larger kinds of painters' brushes, etc. The second kind are chiefly employed in the manufacture of the fine brushes or hair pencils used by painters and artists. The best bristles come from Russia. Besides the camel, hairs are yielded for this purpose by the badger, sable, goat, dog, etc. See Brush and Broom.

Human Hair is sometimes employed for ornamental purposes, as chains and artificial flowers, but its principal use is to supply natural deficiencies, and for this purpose it is made up into wigs, toupees, and switches. See Wig.

The greater part of the hair used in Great Britain and the United States is imported through French dealers, who collect it from the peasant girls of Holland and Germany, as well as from the various departments of their own countries. The light colors are usually obtained from the former countries, and the dark shades from Brittany. This does not arise from the circumstance that these countries yield the finest heads of hair, but because the poverty of the people cause its sale to be a matter of importance. The girls sell all but the front hair, and then wear a handkerchief or *coiffe* to hide their shorn locks. At the annual French fairs regular meetings are arranged, where the purchases are made. The average price for a full head of hair is about $2, though $5 or more is sometimes paid for an extra fine head.

HAIR-POWDER. A pure white powder, made from pulverized starch, scented with violet or some other perfume, and at one time largely used for powdering over the head. The fashion of using hair-powder came into vogue at the French Court during the reign of Charles IX. (end of the sixteenth century). Those who had dark hair used violet, blonds used iris. During the two succeeding centuries it was largely used in England, France, and other European countries by both men and women of the higher and middle classes. Even the wigs during the age of Louis XIV. began to be filled with it. To make the powder hold, the hair was usually greased with pomade, and accordingly the fashion was extremely troublesome. In England an act of Parliament fixed that the fine dust of which the powder was composed should be made from starch alone. In 1795 a tax of a guinea (afterwards £1 3s. 6d.) was put on the use of hair-powder, and at one time yielded £20,000 per annum, but it had the effect of causing hair-powder to fall into general disuse. The French Revolution, which tended to simplify fashion, hastened the return to natural and unpowdered hair. At the present day powder continues to be used by some of the footmen of the nobility and higher ranks as part of their livery; and occasionally, at public or private *bals costumés*, ladies and gentlemen still appear with their heads powdered. The tax on hair-powder was done away with in 1869. At the time of its abolition, it was paid by about 800 persons, and yielded a revenue of about £1000 a year. See Hairdressing; Wig.

HAIR-SEAL. Any seal not a fur-seal. More especially, however, the term designates the typical, or true, seals of the family Phocidæ. See Seal.

HAIR-SPRING. See Balance and Balance Spring; Watch.

HAIRSTREAK. A butterfly of the family Lycænidæ, and commonly one of the genus Thecla. The hairstreaks may be distinguished from the 'coppers' and 'blues' of the same family by the fact that the radius of the fore wing is only three-branched. They are brown, with very fine stripes on the lower surface of the wing, hence the common name. A few species are blue or green. Some of the stigmata are filled with scent-scales, known as 'andriconia.' There are fifty species of hairstreaks in North America. The largest species (*Thecla halesus*), found in the southeastern part of the United States, expands two inches. The male is bright blue and black; the female has more black than the male. The commonest species in New England is *Thecla calanus*, a small, dark brown form. The larvæ of the more common of the hairstreaks feed on the oak; others feed upon wild plum, the hop-plant, Astragalus, Hosackia, and other plants, and some are especially fond of the unopened flowers.

HAIRTAIL (so called from the attenuated tail). A fish of the spiny-rayed family Trichiuridæ, characterized by the compressed and elongated body, the posterior end of which gradually tapers into a fine filament. The dorsal fin is long and low, and composed of spines and rays almost hidden in the skin. There are no caudal or ventral fins and the skin bears no scales. They are voracious fishes of the high seas, principally confined to the tropics and growing to a considerable length. Compare CUTLASS-FISH; THREADFISH.

HAIRWORM. Any of the long, thread-like nematode worms of the parasitic order Gordioidea. (See GORDIUS.) In these nematodes the body-cavity is lined by a distinct epithelium; there is a simple large ventral nerve-trunk, and the reproductive organs are arranged metamerically and are separate from the gonoducts. The group includes a small number of species, which are parasitic in locusts and other insects in the asexual, but free and mobile in the sexual stage. They inhabit moist situations, are sometimes found on the leaves of plants, but more frequently in stagnant pools, and in mud, through which they work their way with great ease. They often twist themselves into complex knots, whence their name Gordius, from the celebrated Gordian knot, and many of them are sometimes found thus twisted together; but they are also often to be found extended in the water. The eggs are laid in long chains in the water, and the young which hatch from them swim about until they reach some aquatic larvæ into which they bore and encyst. When this insect is eaten by some minnow or other small fish the cyst is dissolved and the young Gordius lives parasitically in the intestine of its new host, until it reaches sexual maturity, when it bores its way out of the cyst, passes into the intestinal cavity of the fish, and from thence is carried out with the fæces into the water. When fully grown a large hairworm may be nearly three feet long. One popular name is 'hair-eel'; and a notion still prevails even among educated people that it is nothing else than a horsehair, which has somehow acquired life by long immersion in water, and which is destined in time to become an eel, or, as some say, a snake. They are often seen in fresh-water pools or horse-troughs, whence they are supposed by the ignorant to be transformed horsehairs. A popular notion prevails in Sweden that the bite of the Gordius causes whitlow. Most hairworms in their last stage live in ground-beetles and locusts, turning in the intestines of their host, and finally passing out of the anus. Consult Villot, "Monographie des Dragonneaux," in *Archives de zoölogie experimentale*, vol. iii. (Paris, 1874).

HAITI, hā'tê, *Fr. pron.* ä'ē'tē', also called SANTO DOMINGO, or HISPANIOLA. One of the four islands of the Greater Antilles, the second in area and population, and the only island of the West Indies that is politically independent. The name of the island requires special comment because the usage is not uniform. Haiti is the name given to it by the Caribs, who inhabited it, the word signifying 'mountainous' or 'high land.' When Columbus discovered Haiti he renamed it 'Hispañola' (Hispaniola); colonized by the Spaniards the name of Santo Domingo was given to its most important port, and in the course of time the English, French, and even the Spaniards came to know the whole island by the name of its capital and chief settlement. Early in the nineteenth century, at the suggestion of some leading geographers, the original name Haiti came again into use, and is now commonly employed to designate (1) the whole island, and (2) the independent republic which occupies the western four-elevenths of the island's area. The name Santo Domingo (q.v.) is now properly applied only to the republic occupying the eastern seven-elevenths of the island (officially, *República Dominicana*), or the Dominican Republic.

Situated between Porto Rico and Cuba, the island extends from latitude 17° 37′ to 20° N. and from longitude 68° 20′ to 74° 28′ W. (Map: West Indies, L 5). It is about 400 miles long and varies in width from 24 to 165 miles. Haiti has the highest mountains of the West Indies. The island is covered with forested mountain chains and isolated mountain masses, interspersed with fertile valleys. The highest point of the island, Loma Tina, rises to over 10,000 feet, and the average altitude of the Sierra del Cibao is about 7000 feet. The coasts are mostly elevated and greatly indented, forming numerous natural harbors. The rivers, although numerous, are naturally short and swift, most of them having their sources in the mountains. A few of them are navigable for small boats; their mouths are generally obstructed. There are several large lakes in the western part of the island, one of them, Enriquillo, being evidently connected with the Caribbean Sea, judging from the specific gravity of its water and its tides. The principal formations are sandstones and schists, the crystalline zone being found chiefly in the centre of the island. Tertiary deposits are found in some of the mountain chains. The minerals are supposed to be abundant, and some gold is found in the streams. The climate is hot and heavy in the low-lying parts of the island (as at Port-au-Prince), the temperature during June, July, and August frequently rising to about 95°, but rarely above this. The mean annual temperature in the Port of San Domingo is a little cooler than in Port-au-Prince. In the mountains the climate is much cooler, the average for the summer months being about 77°. There are two rainy and two dry seasons, differing in their duration in differ-

ent parts of the island. The rainfall is heaviest in May and June. Although there are no active volcanoes, earthquakes occur not infrequently and are occasionally very disastrous. Haiti has a remarkably rich flora. Most tropical products are found on the island, and many species are indigenous, such as rice, cotton, cacao, ginger, arrowroot, tobacco, and different kinds of fruit. Valuable timber is found in abundance on the mountain slopes. The fauna is relatively poor, and most of the domestic animals are of foreign origin.

The Republic of Haiti, the first of the negro republics, comprises the western part of the island, and with the adjacent islands of Tortuga, Gonave, and Vache covers an area of 10,200 square miles (or, as estimated by others, 11,090 square miles). The country is almost exclusively agricultural, and has a soil exceedingly well adapted for cultivation. The principal product during the French occupation was cane-sugar, of which over 176,000,000 pounds were exported in 1791. Coffee was also cultivated in those days, but only on a limited scale. At present coffee ranks first in the exports of the country, showing, however, a considerable decline during the period of 1891-99. In 1891 the exports amounted to 78,000,000 pounds; in 1899, 61,600,000 pounds. In 1900 it rose to 72,000,000 pounds. The cultivation of coffee is carried on by primitive methods, and large plantations, equipped with improved machinery, are a thing unknown in the Republic. Sugar is grown only in quantities sufficient to meet the domestic demand. While the agricultural possibilities of Haiti are large, the backward condition of agriculture clearly shows that they are not fully utilized. This is due to lack of capital, high export duties, the roadless condition of the country, frequent revolutions, and the unprogressive character of the people. Many kinds of fruit that are cultivated in Jamaica and find a ready market in the United States could easily be grown in Haiti, which has the same advantages in point of distance as Jamaica. Cotton, grown extensively in colonial times, now receives only scanty attention, and very little is available for export. The same is also true of indigo. Logwood is exported in considerable quantities, although the exploitation of the forests is hindered by the lack of transportation facilities. The commerce of Haiti fluctuates between $15,000,000 and $19,000,000, of which the exports amount to about $10,000,000 or $12,000,000. The United States takes only a small portion of the exports, which go mostly to France, Germany, and Great Britain. Two-thirds of the coffee, the principal article of export, goes to France. Very little of the coffee comes to our market, as Brazil coffee is cheaper and gives a larger profit to importers. The United States supplies over 60 per cent. of the imports, consisting chiefly of provisions, flour, and textiles. Haiti has fifteen ports, most of which are open to foreign commerce. The most important of them are Port-au-Prince, the capital, Aux Cayes, Jacmel, and Gonaïves. The roads of Haiti are so poor that travelers from one port to another almost invariably go by sea. The Republic has only one short line of railway, 15 miles long, connecting Cape Haïtien with Grande Rivière. Projects for several other lines are on foot, and a concession for a line between Port-au-Prince and Salt Lake, ultimately to be extended to Santo Domingo, was granted in 1900.

Haiti has a republican form of government, and its present Constitution, adopted in 1889, is an outgrowth of the original instrument of 1805, which has passed through numerous changes and modifications in consequence of the political upheavals to which the Republic has been subjected. The President is elected for seven years by the Senate and Chamber of Communes in joint session. He is assisted by a Cabinet of four members, nominated by himself. The Chamber of Communes consists of 95 members elected directly by the people for three years, each commune being represented in proportion to its population. The Senate has 39 members, chosen by the Chamber of Communes for six years, from two lists, one submitted by the President and one by the Electors. The administrative divisions of the Republic are modeled after those of France. The country is divided into five departments, subdivided into arrondissements and communes. The laws of the Republic are based on the Code Napoléon, and the forms of legal procedure are the same as in France. Foreigners, and especially white foreigners, are prohibited from owning real estate, and are otherwise discriminated against. The Constitution provides for a system of free elementary schools, but this provision is hardly observed, the number of schools in the rural districts being far from adequate. There are altogether about 400 free elementary schools and 5 public lycées. The revenue of the country is derived almost exclusively from import and export duties, a part of the latter being a guaranty for several debts. The import and export duties for 1900 amounted to $4,293,000 and $3,332,300 respectively, showing an increase of over $2,000,000 against the preceding year. The expenditures for the same year amounted to $6,589,480. The public debt was consolidated in 1900, and amounted to $27,000,000 gold. Haiti adopted the gold standard in 1900. The military strength of the Republic is about 7000 men, chiefly infantry. The navy consists of six vessels, which may be rated as third-class cruisers.

No accurate figures for the population of the Republic are available, as no census has ever been taken in the country. An ecclesiastical enumeration of 1894 placed it at over 1,200,000, while more recent estimates give it as 1,700,000. According to general estimates, about 90 per cent. of the total population is black, and the remaining 10 per cent. consists chiefly of mulattoes, including a few Europeans. The mulattoes form the aristocracy of the Republic, and occupy a prominent position in State affairs as well as in the professions. The negroes are, as a rule, inferior in intelligence to the mulattoes, and the relations between them are those of mutual contempt and hatred, a fact which has played a prominent part in the political affairs of the Republic, and hindered considerably its development. The State religion is Roman Catholic, although religious freedom is guaranteed by the Constitution, and the Protestant churches also receive considerable support from the State. In its social and intellectual life Haiti is full of incongruities. The higher classes, who mostly receive their education in France and in many cases travel extensively, do not in any essential respect differ from Europeans of the same class. The peasantry, on the contrary, seem to show a retrograding tendency, in spite of a century of practical self-government and freedom. A

large number of the lower classes, especially in the rural districts, practice *vaudoux*-worshiping, and, according to some authorities, the practice is occasionally accompanied by human sacrifices and acts of cannibalism. Marriage ties are very loose, and polygamy prevails to some extent. The current language is French, but the peasantry speak a dialect. The capital is Port-au-Prince (q.v.). There are United States consuls at Cape Haïtien, Gonaïves, Port-au-Prince, Aux Cayes, Jacmel, Jérémie, Miragoane, Petit Goâve, and Saint-Marc.

HISTORY. The island of Haiti was discovered by Columbus in 1492. In 1496 Bartholomew Columbus founded Santo Domingo, the first European town in the New World. The natives, who were very numerous, were quickly exterminated by their relentless taskmasters, and negroes were imported from Africa to take their place as laborers. The blacks soon came to form the vast majority of the population. After the colonization of the mainland Haiti was neglected, and in the seventeenth century a colony of buccaneers were allowed to make their headquarters at the western end of the island. They were Frenchmen, and as a result of this occupation that part of the island was ceded to France by the Treaty of Ryswick (1697). A prosperous and wealthy French colony grew up, but the large negro population, and especially the turbulent and discontented class of free mulattoes, were a constant source of disquietude to the planters, who would not allow civil rights to any portion of the colored population. During the French Revolution, at a time when there were dissensions among the white population, the negroes and mulattoes, encouraged by the reception accorded to their appeals by the people of France, rose against their oppressors. The insurrection, which broke out in 1791, was marked by the most bloody excesses. In 1793 the commissioners of the French Convention proclaimed the freedom of the blacks. At this time invasions by the British took place. The blacks were rallied, organized, and led to victory by Toussaint L'Ouverture (q.v.), who was recognized by them as generalissimo of their forces in the island, and who expelled the British in 1798. Three years previously Spain had ceded the eastern part of the island to France, and this was now included by Toussaint, who now reigned as dictator in practical independence, within his sphere of authority. In 1801 Napoleon Bonaparte sent a force under General Leclerc to subdue the island. Toussaint was captured and deported to France, where he died in prison (1803). His place was filled by other leaders, and the French were finally expelled in December, 1803. The victorious general, Dessalines (q.v.), declared Haiti independent, and assumed the title of Emperor (1804). He was assassinated in 1806. Then for some years the northern part of Haiti was held by Christophe (q.v.), a negro, who in 1811 assumed the royal title, while Pétion (q.v.) established a mulatto republic to the south. Upon the death of Christophe in 1820, the power was seized by Boyer, the successor of Pétion, who then proceeded to the conquest of the eastern part of the island, which had been reoccupied by Spain, but had revolted, and formed a republic. The whole island was ruled with wisdom and firmness by Boyer (q.v.) as President until his overthrow in 1843. France recognized the independence of Haiti in 1825. In 1844 the eastern part set up for itself as the Republic of Santo Domingo. In the west—the Republic of Haiti—a series of struggles between the blacks and mulattoes for political ascendency lasted for many years. In 1849 the negro President Soulouque proclaimed himself Emperor as Faustin I., and for ten years ruled in a despotic manner, attempting more than once to annex the Republic of Santo Domingo to his dominions. The Republic was restored at the beginning of 1859 by the mulatto Geffrard, who held power till 1867. In 1888-89 civil war raged between the generals Légitime and Hippolite, who were rival candidates for the Presidency. The latter was victorious, and ruled with unlimited authority till his death in 1896. He was succeeded by General Simon Sam, who was President until May, 1902, when he was forced to resign. Civil war ensued between Boisrond-Canal, head of the Provisional Government, and M. Firmin, Haitian Ambassador at Paris, who established a rival government at Gonaïves, in the northern part of the island. In October, 1902, Firmin was overthrown, and in December General Nord was proclaimed President by the army.

BIBLIOGRAPHY. Fortunat, *Nouvelle géographie de l'île d'Haïti* (Port-au-Prince, 1888); Saint John, *Haiti, or the Black Republic* (2d ed., London, 1889); Rouzier, *Dictionnaire géographique et administratif universel d'Haïti* (Port-au-Prince, 1892); Marcelin, *Haïti, études économiques, sociales et politiques* (2 vols., Paris, 1893); id., *Haïti, ses guerres civiles, leurs causes* (Paris, 1893); Justin, *Etude sur les institutions haïtiennes* (Paris, 1894); Vibert, *La république d'Haïti* (Paris, 1895); Prichard, *Where Black Rules White* (London, 1900); Keller, *Erinnerungen aus Haïti* (Aarau, 1900); Tippenhauer, *Die Insel Haïti* (Leipzig, 1893); Edwards, *Historical Survey of the Island of Santo Domingo* (London, 1801); Burney, *Buccaneers of America* (London, 1816); Madiou, *Histoire d'Haïti* (3 vols., Port-au-Prince, 1847); Linstant Pradine, *Recueil général des lois et actes du gouvernement d'Haïti* (5 vols., Paris, 1851-65); Ardouin, *Etudes sur l'histoire de Haïti* (10 vols., Paris, 1853-61); Handelmann, *Geschichte von Haïti* (Kiel, 1856).

HAJDU-BÖSZÖRMÉNY, hī′dụ bē′sēr-mā-ny′. See BÖSZÖRMÉNY.

HÁJEK OF LIBOČAN, hä′yĕk ŭv lē′bô-chän, WENZEL (?-1553). A Bohemian chronicler. He wrote in the Czech language a *Chronicle of Bohemia* (1541), which was translated into German by Johann Sandel (1596), and was long considered one of the best sources of Bohemian history. Modern criticism, however, has found it to be very inaccurate. Consult Palacky, *Würdigung der alten böhmischen Geschichtschreiber* (Prague, 1830-69).

HAJJ, hăj (from Ar. *ḥajja*, to make a pilgrimage). An Arabic word, applied specifically to the pilgrimage to the Kaaba (q.v.) or sanctuary of Mecca, which every Mohammedan, whose means and health permit, is bound to perform, once at least in his life. The original sense of the word appears to be 'circuit,' and points to the ancient custom of passing around a sanctuary as one of the rites connected with a visit to a sacred spot. The word also exists in Hebrew (*hag*), and

while referring originally to the pilgrimage to the sanctuary at Jerusalem in the fall of the year, is generalized as the designation of any of the three great festivals—Passover, Pentecost, Tabernacles—as provided for in the Pentateuchal codes. As concerns the Arabic institution, it appears that many generations before Mohammed a sanctuary in Mecca had acquired considerable popularity among the Arabs. This was due in part to the position of Mecca on the highway leading from Syria to Yemen, and in part to the fact that Mecca was visited annually by many thousands on their way to Okaz, where a great fair was held, which brought Arabs from all parts together. Far more sacred, however, than the sanctuary at Mecca was a mountain, Arafat, outside of the city, and the visit to this mountain, which was the real goal of the ancient Arabic Hajj, was combined naturally with a circuit around the Kaaba. The care of the latter at the time of Mohammed was in the hands of his family, the Koreish, and this circumstance may account for the devotion of the Prophet to the old sanctuary—a devotion which, though inconsistent with his general religious doctrines, he was unable to throw off. With increasing years his fondness for the Kaaba, which he designated as the *Beit Allah* (house of Allah), increased, and his visit to it the year before his death led to the institution of the pilgrimage as one of the five cardinal duties of every Mohammedan. (See MOHAMMEDANISM.) The visit to the Kaaba may be made at any time, but the full rites of the Hajj, including the visit to Arafat, can only be carried out in the twelfth month of the Mohammedan calendar, known as Dhul Hajjeh, or month of pilgrimage. The pilgrims have to set out for their journey one or two months before, according to the respective distances they have to traverse. They first assemble at several variously appointed places near Mecca in the beginning of the holy month, and the commencement of the rites is made by bathing and assuming the *ihrâm* or sacred habit, which consists of two woolen wrappers—one around the middle, the other around the shoulders; the head remains bare, and the slippers must cover neither the heel nor the instep. It is enjoined that the pilgrims, while they wear this dress, shall be particularly careful to bring their words and thoughts into harmony with the sanctity of the territory they now tread—a territory in which even the life of animals is to be held sacred from attack. After assuming the sacred garb the pilgrim must not shave any part of his body, anoint his head, pare his nails, or bathe until the end of the pilgrimage. Arriving at Mecca, the pilgrims proceed at once to the temple, and begin the holy rites there by walking first quickly, then slowly, seven times round the Kaaba, starting from the corner where the black stone is fixed. (See KAABA.) This ceremony (called *tawaf*) is followed by the *sai*, or running, likewise performed first slowly, then quickly, between the two mounts Safa and Merwa, where, before Mohammed's time, the two idols Asaf and Nayelah had been worshiped. These ceremonies, accompanied by prayers, are repeated daily. The next rite takes place on the ninth of the month, and consists in the *wukuf*, or standing in prayer and listening to a sermon on the mountain of Arafat. The whole of the succeeding night is spent in holy devotions at Mozdalifa, between Arafat and Mina. The next morning, by daybreak, the pilgrims proceed to the valley of Mina, where they throw seven stones at each of three pillars, for the purpose of putting the devil to flight. The pilgrimage is completed with the slaughtering of the sacrifices—a sheep, goat, cow, or camel, according to the pilgrim's means—on the same day and in the same place. The sacrifice over, they shave their heads and cut their nails, burying the latter on the same spot. After remaining three more days at Mecca they take leave of the Kaaba, making the seven circuits and drinking water from the holy well Zemzem. Most Mohammedans combine with the Hajj a visit to Mohammed's grave at Medina—some three days' journey from Mecca. The return of the holy caravans is watched everywhere with the most intense anxiety, and is celebrated—as is also the departure—with great pomp and rejoicings. Henceforth the pilgrim never omits to prefix the proud title of Hajji to his name. It is permitted to those who, through bodily infirmity, are incapacitated from performing the holy journey themselves, to send a substitute, who acts as their representative in almost every respect, but this substitute has no share whatever in the merits and rewards belonging to the Hajj.

The number of pilgrims who assemble at Mecca varies greatly from year to year. It has often exceeded 100,000. Sir Wilfrid Blunt (*Future of Islam*, London, 1883) estimates the number in 1880 at about 93,000. The fanaticism of Mohammedans rigidly excludes all non-believers from the sacred soil of Mecca. Consequently the few Christians who have succeeded in visiting the place have done so in disguise and at the risk of their lives. As early, however, as the first decade of the sixteenth century an Italian, Ludovico di Varthema, witnessed the ceremonies and described them in his book of travels (Bologna, 1510; Eng. trans. by J. W. Jones, edited with notes by G. P. Badger in the "Hakluyt Society Publications," vol. xxxii., London, 1863). The first Englishman to enter the sacred city was Joseph Pitts, of Exeter, a sailor, who was captured by Algerine pirates in 1678 and held as a slave for fifteen years, during which time he made the pilgrimage in company with one of his masters. His narrative was published at Exeter in 1704. During the nineteenth century the pilgrimage was performed by the following: The Spanish adventurer Badia, commonly known as Ali-Bei (1807: *Voyage d'Ali-Bei en Afrique et en Asie*, Paris, 1814); Seetzen (1809), whose journal was published after his death by Kruse and Fleischer (Berlin, 1854-59); Burckhardt (1814-15; *Travels in Arabia*, London, 1829); Burton (1853; *Personal Narrative of a Pilgrimage to El-Medinah and Meccah*, 3 vols., London, 1855, several later editions); Bicknell (1862); Von Maltzan (1864: *Meine Wallfahrt nach Mekka*, 2 vols., Leipzig, 1865); Keane (1880: *Six Months in Mecca* and *My Journey to Medina*, London, 1881); Snouck-Hurgronje (1884-85; *Mekka*, 2 vols. and a third of illustration, The Hague, 1888-89); Courtellemont (1894; *Mon voyage à la Mecque*, Paris, 1896). The most thorough and accurate descriptions of the pilgrimage ceremonies are those given by Burckhardt and Burton. Snouck-Hurgronje gives an account of life in Mecca, a history of the city drawn from original manuscript sources, and details regarding

the various classes of the present population, and the arrangements made for receiving and taking care of the pilgrims, based upon a residence in Mecca of more than six months—a longer time than any other European has ever spent there. His illustrations are from photographs. Consult, besides the work already mentioned: Salih Soubhi, *Pèlerinage à la Mecque et à Médine* (Cairo, 1894); August Müller, *Der Islam im Morgen- und Abendland* (Berlin, 1885-87); Snouck-Hurgronje, *Het Mekkaansche Feest* (Leyden, 1880). See MECCA.

HAJJI, hăj'ĭ, *Ar. pron.* hä'jê (Ar. *ḥajjī*, pilgrim, from *ḥajja*, to make a pilgrimage). An Arabic word, signifying one who has performed the Hajj (q.v.) or pilgrimage to Mecca. It is a title of honor added to a person's name as an indication that this religious duty, obligatory upon every Mohammedan, has been performed.

HAJJI BABA OF ISPAHAN, hä'jê bä'bâ ŭv ĭs'pâ-hän', THE ADVENTURES OF. A romance by J. J. Morier (1824). It is an Oriental *Gil Blas*, revealing a world of humorous insight into life in Persia. The Persian Minister to England is said to have remonstrated in behalf of his Government against its satire and plain speaking.

HAJJI KHALFAH, hä'jê käl'fä, MUSTAFA IBN ABDALLAH KATIB TCHELEBI (c.1600-58). A celebrated Turkish historian and bibliographer. He was born at Constantinople about the end of the sixteenth century, and died there in September, 1658. From 1622 till 1633 he was employed in the Turkish army, and had an excellent opportunity of acquiring information regarding matters of history, geography, etc. He made the pilgrimage to Mecca, whence his name Hajji (q.v.). In 1635 he was at Constantinople studying and collecting material for his encyclopædia. In 1648 he was appointed second assessor in the army bureau of provisions. From this position he got his second name, Khalfah (assessor). His works are written in Turkish and Arabic. They include, besides smaller works: (1) the celebrated *Asāmī al-kutūb wa-al-funūn* (Names of Books and Sciences), written in Arabic, and of which Flügel has given a Latin translation with the text, under the title *Lexicon Bibliographicum et Encyclopædicum a Mustapha-ben-Abdallah* (Leipzig, 1835-58). In this work is given a definition of each science; the titles, contents, language, dates of composition, and translation of more than 25,000 works are specified; also the names of the authors and dates of their death. It is the most complete catalogue in existence of works written in Arabic, Persian, and Turkish; (2) *Ta'rīkh kebir* (Great History), a history of the world from the creation of Adam to 1655, containing notices of 150 dynasties, principally Asiatic; (3) a history of the Ottoman Empire from 1595 to 1655; (4) a history of the maritime wars of the Turks, which has been translated into English (London, 1831).

HAJJUG. See HAYYUJ.

HAKATA, hä'kâ-tâ. Formerly a separate city of Japan, now forming a part of Fukuoka (q.v.).

HAKE (abbreviation of provincial Eng. *haked*, from AS. *hacod*, OS. *hacud*, OHG. *hahhit*, Ger. *Hecht*, pipe, from AS. *haca*, bar, Norweg. *hake*, hook; connected also with AS. *hōc*, Eng. *hook*, so called from the hooked shape of the lower jaw). A fish of the family Merluccidæ, closely allied to the cods. Several species are known, all large voracious marine fishes, inhabiting moderate depths, and of little value. The European hake (*Merluccius merluccius*) is common on all the coasts of Europe, and though its flesh is coarse and flaky, is extensively utilized by salting and drying, in which condition it is known as 'stockfish.' It reaches a length of three or four feet. The American 'silver hake' (*Merluccius bilinearis*), of the New England coast, and the Pacific hake (*Merluccius productus*) are also eaten, but are not well liked. The habits of hake are like those of the cod, and they are abundant on the 'banks' off the northern shores of the United States, where they are caught in the same way and at the same time as the common cod. The average weight is about 5 pounds; the maximum weight falls under 20 pounds. This fish is generally eaten in the fresh condition, and does not 'take salt' as well as the common cod, but is smoked and dried sometimes. The annual yield in the United States is about 50,000,000 pounds, valued at $1,115,000. The spawning season lasts from January to June. See FISHERIES; and Plate of CODFISH AND ALLIES.

The name is also given in New England to various codlings of the genus Urophycis, as the squirrel-hakes (*Urophycis chuss* and *tenuis*), but they are not of much value except for their sounds, or air-bladders.

HAKE, EDWARD (?-1579). An English satirist. He held a number of political offices in New Windsor, and from October 10, 1588, till March 29, 1589, represented that town in Parliament. He was a stanch Puritan, and most of his works are satires directed against the abuses of the day. The best known is *Newes Out of Pavles Churchyard, A Trappe for Syr Monye*, which appeared in 1567. Probably no copy of this edition is now in existence, but a reprint was issued in 1579 under the title *Newes Out of Powles Churchyarde*, etc., and this has been reproduced among the "Isham Reprints" (1872). Many of Hake's other works either have been lost or are very rare.

HAKE, hä'ke, KARL VON (1768-1835). A German soldier, born at Flatow in Brandenburg. He began his military career as an ensign in the guards, took part in the battles connected with the French Revolution, in 1809 was appointed to a post in the War Ministry, and in 1810 became chief of the War Department. In 1813 he attracted much attention by his efficient preparations for war, subsequently commanded a brigade in Bülow's corps with rank of major-general, and took a distinguished part in the battle of Waterloo. From 1819 to 1833 he was Minister of War, in which capacity he carried out important schemes of reorganization.

HAKE, THOMAS GORDON (1809-95). An English poet, called 'the parable poet.' He was born at Leeds, was educated at Christ's Hospital, and traveled on the Continent. He studied medicine, and settled as practitioner in East Anglia, where he formed a friendship with George Borrow. Afterwards he visited Canada and the United States, and finally settled in London, where he became the physician and lifelong friend of Rossetti. His poems display marked originality and talent, but are frequently obscure,

owing to their subtilty and symbolism. They comprise: *Poetic Lucubrations* (1828); *Madeline, with Other Poems and Parables* (1871); *Parables and Tales* (1872); *New Symbols*, his best work (1875); *Legends of the Morrow* (1878); *The Serpent Play, a Divine Pastoral* (1882). Consult: *Select Poems*, ed. by Meynell with a portrait of Rossetti (London, 1894); and Hake, *Memoirs of Eighty Years* (London, 1892).

HAKE'S DAME. The British codling. The term 'hake' is used very confusingly. In the Eastern United States the species of Urophycis are the fishes usually called 'hake,' while the true hake (Merluccius) is known as 'silver hake' or 'whiting'; and the corresponding species of England (*Phycis blennioides*) is called 'hake's dame' or 'forkbeard.'

HAKE'WILL, GEORGE (1578-1649). An English clergyman and author. He studied at Saint Alban Hall, Oxford, and afterwards was elected a fellow of Exeter College. He was one of the two clergymen appointed in 1612 to preserve Prince Charles 'from the inroads of popery.' Boswell says that Johnson studied his writings for their style. His works include: *The Vanitie of the Eie. First beganne for the comfort of a gentlewoman bereaved of her sight and since upon occasion inlarged* (2d ed. 1608; 3d ed. 1615; and another impression 1633); *A comparison betweene the Dayes of Purim and That of the Powder Treason* (1626).

HAKIM IBN ALLAH, hä'kĭm ĭbn ăl'lá, also called AL-MOKANNA, 'the veiled.' Founder of a Mohammedan sect in the eighth century, and leader of a revolt against Mahdi, the third Abbaside Caliph. He came from Merv in Khorassan and began his career as a private soldier, soon became captain, and subsequently headed a band of his own. In one of his fights he lost an eye, and henceforth wore a veil. Hakim's religious teaching was that God enters the body of men at various times—e.g. Adam and Noah—and that He had entered his body. He claimed to perform miracles and is said on one occasion to have caused the moon to appear out of a wall; hence he is sometimes called 'moon-maker.' His alleged miracles gained him numerous adherents and with them he captured many strongholds. For a time the armies sent against him were defeated, but finally Mahdi dispatched Said al-Harashi, who took city after city, and compelled Hakim to withdraw to Kash, where he was surrounded. In this predicament Hakim poisoned his soldiers and burned himself to death. The story of the veiled prophet has been put into poetical form by Moore in *Lalla Rookh*. Consult Weil, *Geschichte der islamitischen Völker* (Stuttgart, 1866).

HAKKAS, häk'kaz (Chin., stranger families). An interesting class of people found in different provinces of Southern China, but chiefly in Kwang-si, Kwang-tung, and Fu-kien, whence they have spread to Formosa, Hong Kong, Hainan, and even to the Straits Settlements. Their origin is unknown, but for some unaccountable reason they appear to have been for over 2000 years the object of the most persistent and inveterate hostility and persecution at the hands of the native or *punti* part of the population of China. Hence they live in communities by themselves. In some districts they form the entire population, as in the prefecture of Kia-ying Chow; in others they form two-thirds of the population. They are a hard-working, thrifty people, engaged in agriculture, and as quarrymen, stonemasons, porters, barbers, etc. In dress and in customs they differ from the Chinese. The women are handsome, do not bind their feet, and are not secluded like the Chinese women. Their language is evidently Chinese, resembling more the Mandarin dialect of the north than any of the other dialects.

Tradition and their family records and registers place them in Shan-tung and other northern parts of China about the middle of the third century B.C. It has been suggested that they may be the descendants of the aboriginal tribes found in Northern China when the Chinese themselves arrived in the country from their original home.

They seem to have incurred the displeasure of the first universal Emperor of China (c.250 B.C.), and a bloody persecution followed, in which some of the clans were wiped out. The remnant fled to the mountains, whence most of them began their wanderings southward in search of a permanent home, but persecution met them everywhere. Sometimes they were permitted to settle down quietly, and remain undisturbed for generations, as, for example, under the Han dynasty, when some of them attained to high office, a circumstance, however, which led to fresh outbreaks, more slaughter, and renewed migrations. During the T'ang dynasty (seventh, eighth, and ninth centuries), they settled in the mountains of Fu-kien and the borders of Kwang-tung, where they were when Kublai Khan and his Mongol armies undertook to conquer China. Large numbers of the Hakkas joined the Imperial Army and fought for the native dynasty with the utmost bravery. During the disturbances incident to the expulsion of the Mongols, and the establishment of the Ming dynasty (1368), fierce persecutions again broke out and large numbers moved to Kwang-tung, whence smaller colonies have made their way into the adjoining regions. Kia-ying Chow, which is entirely Hakka, is noted for its scholars, many of whom compete successfully with the Chinese in the public examinations. Hung Hsü-ch-'üan, the originator and leader of the Tai-ping Rebellion, and all his principal generals, were Hakkas.

BIBLIOGRAPHY. The literature of the subject is not extensive, but is interesting. Consult: "Ethnographical Sketches of the Hak-ka Chinese," in *Notes and Queries on China and Japan*, vol. i. (Hong Kong, 1867, and reprinted in the *China Review*, vol. xxi., London, 1894-95); "An Outline History of the Hakkas," in *China Review*, vol. ii., and in the same volume, Pitou, "On the Origin and History of the Hakkas" (London, 1873-74); *Une visite au pays des Hakka dans la province de Canton* (1892); Ball, *Things Chinese* (London, 1893); *First Lessons in Reading and Writing the Hakka Colloquial* (Basel, 1869); Schaub, "Proverbs in Daily Use Among the Hakkas," in *China Review*, vol. xxi. (London, 1894-95).

HAKLUYT, häk'lōōt, RICHARD (c.1552-1616). An English writer on geography and history. After getting his degree at Oxford he lectured on the above subjects. In 1582 he published *Divers Voyages Touching the Discovery of America*, which attracted considerable attention, and probably secured his appointment as chaplain to the

English Ambassador at Paris in 1583. There he collected all available information respecting French and Spanish voyages, and in 1584 wrote *A Particular Discourse Concerning Western Discoveries*, first printed in 1877, in the collections of the Maine Historical Society. In 1587 he published a translation of the journal of the French explorer Réné Laudonière. The following year he returned to England and busied himself in preparing for publication his *Principall Navigations, Voiages, and Discoveries of the English Nation*. This appeared in one volume in 1589, but it met with such popular success that Hakluyt proceeded to collect material for a new and enlarged edition, which was published in three volumes in London in 1598-1600. In 1602 Hakluyt was made prebendary of Westminster, and in the following year archdeacon. He lent his influence to solicit a patent for the colonizing of Virginia from the King, and was one of the adventurers in the London or South Virginia Company. Besides his published works, he left a large collection of manuscripts. Hakluyt's *Voyages* have been reprinted twice, in 1809-12, and in rearranged form by Edmund Goldsmith at Edinburgh in 1889-90. His best monument is the society that bears his name. Consult: An account of Hakluyt in the introduction by J. W. Jones to the society's edition of the *Divers Voyages Touching the Discovery of America* (London, 1850); also an article by Froude in *Short Studies on Great Subjects*, vol. i. (London, 1867); and *Voyages of Elizabethan Seamen: Select Narratives from Hakluyt's Principal Navigations*, edited by Payne (Oxford, 1893-1900). See HAKLUYT SOCIETY.

HAKLUYT, RICHARD, 'of the Middle Temple' (about 1580), a cousin of Richard Hakluyt. He was exceedingly influential in arousing English interest in the colonization of the New World. It was, indeed, at his lodgings and as a result of conversations with him, that his cousin received the inspiration which has made their name synonymous with the history of the beginnings of Greater Britain. In 1585 he drew up some extremely valuable "Inducements" for those who were contemplating the voyage to America, and two years later he was among those chiefly instrumental in sending Frobisher to the Northwest. From 1578 onward he was in constant communication with nearly every adventurer who made the American voyage, and his correspondence, preserved by his cousin, furnishes many important details regarding these early undertakings. There are many evidences that his sound judgment and wise counsel gave him a leading position among the English Imperialists of his generation.

HAKLUYT SOCIETY. An association organized in December, 1846, for the purpose of "printing and distributing among its members the most rare and valuable voyages, travels, and geographical records, from an early period of exploratory enterprise to the circumnavigation of Dampier." Between 1847 and 1899 ninety-seven volumes were issued under the editorial supervision of eminent authorities in geographical science, containing original or contemporary accounts of travels and exploration in all parts of the world. Notable publications were: *Select Letters of Columbus* (1849 and 1870); Raleigh's *Guiana* (1848); Hakluyt's *Divers Voyages* (1850); Galvano's *Discoveries of the World* (1862); Garcilasso de la Vega's *Royal Commentaries of the Incas* (1869 and 1871); Pigafetta's account of Magellan's voyage (1874); *The Observations of Sir Richard Hawkins* (1877); *Commentaries of the Great Alfonso Dalboquerque* (4 vols., 1870-84); *The Journal of Christopher Columbus* (1893); *The Letters of Amerigo Vespucci* (1894); *Danish Arctic Expedition* (1897). The president of the association after 1889 was Sir Clements Markham.

HAKODATE, hä'kô-dä'tâ, or **HAKODADI**, hä'kô-dä'dê. The northernmost of the treaty ports of Japan, situated at the southern end of the island of Yezo (Map: Japan, G 3). It lies at the foot of a bald rock, and has a fortified and extensive harbor. It is a well-built, well-kept town, but of little architectural interest. The chief buildings are the Japanese Club, the town hall, and the naval school. There is also an American mission school. It has water-works and a tram line. As a commercial port it is of but slight importance, owing to the comparatively undeveloped state of Yezo. The total trade of the port for 1900 amounted to about $3,000,000. Population, in 1887, 55,677; in 1898, 78,040. The foreign population, consisting mostly of missionaries, is about 160. Hakodate was opened to foreign commerce in 1859.

HAKON, hä'kôn. The name of several kings of Norway. See HAAKON.

HAL, häl. A town of Belgium, in the Province of South Brabant, on the river Senne and the Charleroi Canal, nine miles southwest of Brussels (Map: Belgium, C 4). The fourteenth-century Church of Saint Mary is a rich Gothic edifice, containing a miracle-working wooden image of the Virgin and visited on that account by numerous pilgrims. The town has an episcopal institute, and manufactures of paper, porcelain, and other articles. Population, in 1890, 10,441; in 1900, 12,284.

HALACHA, hâ-lä'kâ (Heb., rule of procedure, from *halak*, to go). The general term for the Jewish oral law, which runs parallel with the written law contained in the Bible, and is supposed to be, like this, of divine origin. Its relation to the ordinances contained in the Pentateuch is that of an amplified code to the fundamental religious and civil maxims. The theory being that the oral law was handed down through a long chain of highest authorities (Sinaitic revelation, Moses, Joshua, elders, Great Synagogue [Ezra], etc.), it could only be treated and further developed by the foremost men of each generation, who through their eminence in learning belonged to a kind of aristocracy of mind (*hakamim*, wise men), towering above the multitude (*hediotim*, laymen). Their decision on all ordinances involved in contradictory traditions was final, because it was believed to spring from a deeper apprehension of Scripture. An elaborate system of interpretation of the biblical texts was devised, which, frequently sacrificing the spirit to the letter, attached great weight to certain special letters, words, and even signs in the Old Testament, which, seemingly superfluous where they stood, were supposed to point to the injunction under discussion. Halacha embraces the whole field of juridico-political, religious, and practical life, down to its most minute

and insignificant details. Originally, as already said, the oral law *par excellence*, it began to be written down when, as was natural, various opinions and traditions arose as to the correct practice and the danger of sectarianism was imminent. The first collection of laws was instituted by Hillel, Akiba, and Simon ben Gamaliel; but the final redaction of the general code, the *Mishna* (q.v.), is due to Jedudah Hanassi, about A.D. 220. Later additions to this code are the *Baraithas* and *Tosephtas*. Of an earlier date with respect to their contents, but committed to writing in later times, are the three Haggadic books (Midrashim): *Siphra* or *Torath Kohanim* (a Haggadic amplification of Leviticus), *Siphre* (of Numbers and Deuteronomy), and *Mechiltha* (of a portion of Exodus). The rabbis of the Mishnaic period are called the *Tanaim*. These were followed by the *Amoraim*, who, by discussing and further amplifying the Mishna, became the authors of the Gemara (q.v.). The Halacha was further developed in subsequent centuries by the Saboraim, Geonim, and the authorities of each generation. See HAGGADA; MIDRASH; TALMUD.

HALAS, hŏ′lŏsh. A town of Hungary, situated near the lake of Halas, in the county of Pest-Pilis-Solt-Kis-Kun, about 80 miles south-southeast of Budapest (Map: Hungary, F 3). The chief industry is agriculture and the cultivation of the vine. Population, in 1890, 17,100; in 1900, 19,856.

HALAYA, â-lä′yâ, or **HARAYA**, â-rä′yâ. A Visayan dialect in Panay Island, Philippines (q.v.).

HALBERD, or **HALBARD** (from OF. *halebarde*, Fr. *hallebarde*, Ger. *Hellebarte*, from MHG. *helmbarte*, halberd, from *helm*, *halm*, Ger. *Helm*, handle, AS., Eng. *helm*, tiller + MHG. *barte*, Ger. *Barte*, axe; connected also with OHG. *bart*, Ger. *Bart*, AS., Eng. *beard*). A weapon employed in mediæval warfare, consisting of an axe-blade balanced by a pick, and having a pike-head at the end of the six-foot shaft. It was used by the Germans, Swiss, and Danes previous to the thirteenth century, and up to the sixteenth century was borne by sergeants of foot and artillery and companies of so-called halberdiers. The 'huscarles' of Canute were armed with the halberd. The Swiss were the first to change from the halberd to the pike and similar weapons. In the famous battle of Morat (1476), in which the Swiss overthrew Charles the Bold of Burgundy, halberds and pikes were used by the former. The English used the halberd previous to the Tudor period, but as it was an expensive weapon, the halberdiers were restricted to a select corps for the protection of the 'colors.' In France the halberd was very little used.

HALBERSTADT, häl′bĕr-stät. Capital of the circle of the same name in the Prussian Province of Saxony, situated on the Holzemme, 28 miles southwest of Magdeburg (Map: Prussia, D 3). It is an ancient town with many old-fashioned buildings and some fine specimens of wood architecture from the fifteenth and sixteenth centuries. The Cathedral of Saint Stephen, rebuilt very slowly after the fire of 1179, and recently restored, contains some good reliefs, wood sculptures of the thirteenth century, a number of pictures, and many antiquities in its treasury. The Church of Our Lady, constructed in 1005-1284, contains fine reliefs and mural paintings. Among the most interesting secular buildings are the town hall, a Gothic structure of the fourteenth century, the market, and the Ratskeller, a wooden Late Gothic building of the fifteenth century. Halberstadt has a gymnasium originally founded in the ninth century and reorganized in the seventeenth, two seminaries, two fine libraries, a collection of portraits by Gleim, a number of private collections of paintings, coins, and antiquities, and a theatre. The manufactures of the town comprise sugar, spirits, beer, cigars, leather, soap, and gloves. Halberstadt became the seat of a bishopric as early as 804, and obtained municipal rights at the end of the tenth century. The bishopric of Halberstadt was secularized in 1648 and given as a principality to Brandenburg. Population, in 1890, 36,786; in 1900, 42,810.

HALBERTSMA, häl′bĕrt-smä, TJALLING (1841—). A Dutch gynæcologist, born at Sneek. He studied medicine at Leyden (1858-63), where he got his degree with a dissertation *Over den keelspiegel enz;* and then at Tübingen, Vienna, and Paris. He was professor at Groningen (1866-67), and then went to the University of Utrecht. Besides many contributions to medical journals in Holland and abroad, and an essay on English contributions to gynæcology (1867), Halbertsma wrote: *Ovariotomie* (1873); *Craniotomie* (1874); and *Ueber die Aetiologie der Eclampsia Puerperalis* (1882).

HALBIG, häl′bĭk, JOHANN (1814-82). A German sculptor. He was born at Donnersdorf, in Lower Franconia, July 13, 1814, and was educated at the Polytechnic School and at the Academy of Fine Arts in Munich. In 1845 he was appointed professor of sculpture in the Polytechnic Institute, Munich, in which city is a great part of his work. His most notable production is the group of a quadriga and lions on the triumphal arch. He also carved the lions of the Pinakothek, and statues of Roma and Minerva in the palace gardens. He made eighteen colossal statues representing the leading German provinces of Kehlheim; sixty busts for the Pinakothek (Munich); a statue of King Maximilian II. for Lindau (1854); a monument of Platen at Ansbach (1858); the monument of Marshal Cachahiba d'Argolo in Bahia, Brazil; a statue of King Louis I. for Kehlheim. Among the most important of his later works are a statue of Frauenhofer in Munich (1866); an equestrian statue of King William I. of Württemberg for Cannstatt (1876); the "Emancipation" group of sculpture in New York (1867-68); and the "Passion" group at Oberammergau (1875). His work is characterized by its decorative quality, is carefully executed, and true to nature. He died at Munich, August 29, 1882.

HAL′CYON DAYS (Lat. *halcyon*, influenced by popular confusion with Gk. ἅλς, *hals*, salt + κύειν, *kyein*, to conceive, from Gk. ἀλκυών, *alkyōn*, ἀλκυών, *halkyōn*, kingfisher; connected with Lat. *alcedo*, kingfisher). A name given by the ancients to the seven days which precede and the seven days which follow the shortest day of the year. The reference is to a fable, that during this time, while the halcyon bird or kingfisher was breeding, there always prevailed calms at sea. From this the phrase 'halcyon days' has come to signify times of peace and tranquillity.

HALCYONE, hăl-sī′ô-nê. A Greek divinity. See ALCYONE.

HALDANE, James Alexander (1768-1851). A Scotch clergyman, brother of Robert Haldane (q.v.). He was born at Dundee, July 14, 1768, and educated at Edinburgh University. He became a midshipman in 1785, and in 1793 the commander of the *Melville Castle,* but before the ship sailed a radical change took place in his character. He sold his command and his interest in the ship and stores and retired with his wife to Edinburgh (1794), giving his chief attention to religious concerns. He organized many Sabbath schools, and preached extensively in the villages and large towns of Scotland, and as congregations were gathered they were provided with houses of worship by the liberality of his brother Robert. He left the Church of Scotland in 1799 and founded a Congregational church in Edinburgh, the first in Scotland, and was ordained pastor. From 1801 till his death in Edinburgh, February 8, 1851, he acted as pastor of Leith Walk Tabernacle, Edinburgh, without salary. In 1808 he embraced Baptist sentiments, a change which split the Scotch Congregational body. He wrote several controversial works against the Irvingites, Erskine of Linlathen, and others; also *Early Instruction Commended in a Narrative of Catharine Haldane* (his daughter, who died at the age of six), with an *Address to Parents on the Importance of Religion* (12th ed. 1801); *The Atonement* (1845, 5th ed. 1877); *An Exposition of Galatians* (1848). For his life consult Alexander Haldane (London, 1852).

HALDANE, Robert (1764-1842). A philanthropist and preacher of Scotch descent. He was born February 28, 1764, in London. He inherited a large property, but, having a passion for the sea, after studying but a short time in Edinburgh University, he entered the navy, where he served with honor (1780-83). When the French Revolution commenced he regarded it with pleasure and hope, but was soon disappointed by its excesses. Having, after a season of doubt, become convinced of the divine origin of Christianity, he heartily embraced it, and resolved to devote his life and fortune to its advancement, and in 1796 he selected India as a field for missionary operations, intending to go himself as a missionary, and engaged the coöperation of several ministers to whom he pledged a sufficient support; but as the East India Company refused to sanction the enterprise, it had to be given up. He then resolved to work at home. In company with Rowland Hill and others, he was very successful in awakening throughout Scotland a deep interest in the subject of religion. The unusual methods of work which they adopted excited the opposition of the Scottish General Assembly. Field preaching was forbidden and other features of the revival were disapproved. Haldane seceded from the Established Church (1799) and entered the Congregational body, and, at his own cost, erected tabernacles for public worship in many of the large towns of Scotland. At his expense also, 300 young men were educated for the ministry under several eminent teachers. In 1808 he adopted Baptist views, engaged in personal labors to promote religion in the south of France and in Switzerland (1816), and in 1817 removed to Montauban. By his work in Geneva a new impulse was given to evangelical Christianity, and an important theological school was established. In 1819 he returned to Scotland. Previously (1798) his attention had been directed to missionary work in Africa, and, as a beginning, he had 30 children brought to England from Sierra Leone to be educated. He died in Edinburgh, December 12, 1842. Several of his writings had a large sale: *The Evidence and Authority of Divine Revelation* (1816, 2d ed. 1834); *The Books of the Old and New Testament Proved to be Canonical, and Their Verbal Inspiration Maintained and Established* (1830, 7th ed. 1877); *Exposition of Romans* (1835; 2d ed. 1874). For his life, consult Alexander Haldane (London, 1852).

HALDEMAN, häl'de-mân, Samuel Stehman (1812-80). An American naturalist, born at Locust Grove, Lancaster Co., Pa. He studied for two years at Dickinson College, was made assistant in the Geological Survey of New Jersey in 1836, and from 1837 to 1842 was engaged in similar service in Pennsylvania. He became professor of the natural sciences at the University of Pennsylvania in 1851, and in 1855 was called to a similar chair in Delaware College. From 1869 until his death he was professor of comparative linguistics in the University of Pennsylvania, he being the first to occupy the chair in that institution, and during this period made a careful study of Indian dialects. In addition to numerous papers on scientific and philological subjects, he published: *Elements of Latin Pronunciation* (1851); *Tours of a Chess Knight* (1865); *Pennsylvania Dutch* (1872); and *Word Building* (1881).

HAL'DIMAND, Sir Frederick (1718-91). A Swiss soldier of fortune in the service of Great Britain. He was born in the Canton of Neuchâtel, served in the Sardinian Army and under Frederick the Great, but was in the Swiss Guard at The Hague in 1756, when, together with his friend and fellow countryman, Col. Henry Bouquet, he went to the British colonies in America, then in the throes of the French and Indian War, to enlist and command, under Lord Loudoun, a regiment of Germans, Swiss, and other nationalities, chiefly in Pennsylvania, to be called the Royal Americans. He successfully defended Oswego, and thus saved Niagara, in 1759; was with General Amherst at the capitulation of Montreal, 1760; was Military Governor at Three Rivers; for six years was in charge of the English garrison at Pensacola, Fla. (1767-73), and then in command at New York for about a year during Gage's leave of absence. He supported that general through the siege of Boston, and was recalled to advise the British Ministry upon American affairs, but was sent out again as Governor of Canada (1778-84). General Haldimand held down with a firm hand the French Canadian sympathizers with the American Revolution, and welcomed and cared for the many thousands of loyalists who sought refuge in Canada during and after the war. He represented Great Britain in the Vermont negotiations with the Allens and others, and he left behind him a mass of most valuable official correspondence relating thereto, as well as to the general history of America for the latter half of the eighteenth century. These papers, called the Haldimand Collection, were bequeathed to the British Museum by Sir Frederick's grandnephew (1858), and have recently been copied for the Dominion Archives at Ottawa.

HALE, Benjamin (1797-1863). An American educator. He was born at Newbury, Mass.; graduated at Bowdoin College (1818), studied theology at Andover, and entered the Congregational ministry in 1822. The next year he became a tutor at Bowdoin, and from 1827 to 1835 was professor of chemistry and mineralogy at Dartmouth. While there he took orders in the Protestant Episcopal Church. From 1836 to 1858 he was president of Geneva (now Hobart) College. He published: *Scriptural Illustrations of the Liturgy* (1835); *Liberty and Law* (1838); and *Education in Its Relations to a Free Government* (1838). Consult Douglass, *Life of Benjamin Hale* (1883).

HALE, Charles Reuben (1837-1900). An American bishop of the Protestant Episcopal Church, born at Lewiston, Pa. He graduated at the University of Pennsylvania (1858); was a chaplain in the Union Army (1863); and after varied service in Pennsylvania, New York, and Maryland, became Dean of Davenport, Iowa (1886), and six years later Assistant Bishop of Springfield, with the title of Bishop of Cairo. A High-Churchman in his theology, Bishop Hale was a prominent sympathizer with the Greek Church; was secretary to the Russo-Greek Committee in 1871, and acted as clerk to the Commission on Correspondence with the hierarchs of the Eastern churches and of the Old Catholics (1874). His writings include: *A List of All the Sees and Bishops of the Holy Orthodox Church of the East* (1872); *The Mozarabic Liturgy, and the Mexican Church* (1876); *Russian Missions in China and Japan* (1878); *Order for Holy Communion, Arranged from the Mozarabic Liturgy* (1879); and *The Universal Episcopate* (1882).

HALE, Edward Everett (1823—). An American author, clergyman, and philanthropist, born of a well-known family in Boston, Mass., April 3, 1823. He was educated at the Boston Latin School, graduated at Harvard in 1839, and received an honorary degree forty years later. After a short period of tutoring he studied theology, and was a Unitarian pastor at Worcester from 1846 to 1850. After that he preached in Boston, and took an active interest in all the philanthropic movements of his city and time. A collected edition of his works, in ten volumes, was completed in 1901, but it represents only a small portion of his literary work. He contributed voluminously to magazines and newspapers, and edited several of them; for example, the *Christian Examiner* and *Old and New* (1869-75), a magazine of which he was founder, and which finally was merged into *Scribner's Monthly*. He also took great interest in history, and especially in Spanish-American affairs; contributed to Winsor's great coöperative histories; edited Lingard's *England;* and wrote a *Chautauquan History of the United States* (1887); a *Life of Washington* (1887); *Franklin in France*, with his son, E. E. Hale, Jr. (1887-88); and other kindred works. With his sister, Susan Hale, he wrote several volumes of travels. In *A New England Boyhood* (1893) and in *James Russell Lowell and His Friends* (1889), he gave his reminiscences of New England and New Englanders of the past. But he is perhaps best known for his fiction, and especially for one short story, the famous and effective *Man Without a Country*, published anonymously in the *Atlantic Monthly* in 1863, and collected with other stories in a volume five years afterwards. Another short story, *My Double, and How He Undid Me*, published in the same periodical in 1859, also attracted great attention, as well as his "Skeleton in the Closet," which appeared in the *Galaxy* in 1866. But his most influential book is his *Ten Times One is Ten* (1870), which led to the formation of many charitable organizations — Lend-a-Hand clubs, King's Daughters, etc. Mention may also be made of *The Ingham Papers* (1869); and an elaborate piece of historical fiction, *Philip Nolan's Friends* (1876), a romance of the early Southwest. His *Memories of a Hundred Years* appeared in 1902.

HALE, Eugene (1836—). An American legislator, born at Turner, Maine. He studied law at Portland, and was admitted to the bar in 1857. From the Maine Legislature, to which he was elected again in 1880, he was sent to the Forty-first Congress in 1868, and was four times reëlected. During his Congressional career he served on the Committee on Appropriations, and during his last term was chairman of the Republican Congressional Committee. Hale was a delegate to the Republican conventions of 1868, 1876, and 1880, and strongly urged the nomination of Blaine in the last two. He declined the Post-office portfolio in Grant's second Cabinet (1874), and, after service in Grant's 'private commission' for the canvass of the Presidential vote in Louisiana (1876), refused the post of Secretary of the Navy offered him by President Hayes in 1877. In 1871 he married Mary Chandler, daughter of Senator Chandler of Michigan. He was elected to the Senate in 1881 to succeed Hannibal Hamlin, and was reëlected in 1887, 1893, and 1899.

HALE, George Ellery (1868—). An American astronomer, born in Chicago. He was educated at the Massachusetts Institute of Technology (1890), at the Observatory of Harvard College (1889-90), and at Berlin (1893-94). In 1890 he was appointed director of the Kenwood Astrophysical Observatory. He was professor of astrophysics at Beloit College from 1891 to 1893, lecturer in the same subject at Northwestern University, and associate professor in the University of Chicago until 1897, when he was made full professor. In 1896 he was appointed director of Yerkes Observatory. Hale made special study of spectroscopy, and invented the spectroheliograph. He was joint editor of *Astronomy and Astrophysics* from 1892 to 1895, when he became editor of the *Astrophysical Journal*.

HALE, Horatio (1817-96). An American ethnologist. He was born in Newport, N. H., the son of Mrs. Sarah J. Hale (q.v.), graduated at Harvard in 1837, and accompanied, as philologist, the United States exploring expedition under Wilkes. He made a careful study of the languages and customs of the Pacific islands, and subsequently published the results of his investigations in his *Ethnography and Philology* (1846). After his return he pursued his studies independently, especially among the Indians of Canada. He was admitted to the Chicago bar in 1855, but soon removed to Clinton, Ontario, where he afterwards lived. He was a member of many learned societies, and in 1886 was president of the anthropology section of the American Association for the Advancement of Science. His writings include: *Indian Migrations as Evi-*

deneed by Language (1883), and *The Iroquois Book of Rites* (1883).

HALE, John Parker (1806-73). An American statesman and orator, born in Rochester, N. H. He studied at Phillips Exeter Academy, graduated at Bowdoin College in 1827, and three years later was admitted to the bar. His political career began in 1832, when, as a strong Jacksonian Democrat, he was elected to the New Hampshire State Legislature. In 1834 he was appointed by President Jackson United States District Attorney for New Hampshire, was reappointed by Van Buren in 1838, and served until removed by Tyler in 1841. His nomination and election to Congress in 1842 followed naturally. Once in Congress, however, he soon asserted his independence, and spoke and voted against the adoption of the 'gag rule' (q.v.), intended to put a stop to anti-slavery petitions. He still remained a stanch Democrat, however, supported Polk and Dallas in the campaign of 1844, and was renominated without opposition. Before the Congressional election, however, Texan annexation having been adopted by the Democratic Party as one of the main features of its programme, the New Hampshire Legislature, in December, 1844, passed resolutions instructing its Senators and Congressmen to favor that policy. Hale, however, came out with a public statement opposing annexation on anti-slavery grounds. The Democratic State Convention was thereupon hastily reassembled at Concord. Hale was branded as a traitor to the party, and his name was stricken from the ticket. In the subsequent election he ran as an independent candidate, and as neither he, the regular candidate, nor the Whig candidate obtained a majority of the votes cast, the district was unrepresented. In the face of an apparently invincible Democratic majority, he set out to win the State over to the anti-slavery cause, addressed meetings in every town and village in New Hampshire, carrying on a remarkable canvass known as the 'Hale Storm of 1845,' and was rewarded with seeing the State choose a Legislature in which the Whigs and Independent Democrats had a majority of the votes. He himself was elected to the Lower House, and was chosen Speaker, and in 1847 was elected to the United States Senate. True to his convictions, he alone refused to vote in favor of the resolution tendering the thanks of Congress to Scott and Taylor for their victories in the Mexican War. In 1849 he was joined in the Senate by Chase and Seward, and in 1851 by Sumner, as coadvocates of the anti-slavery cause. In 1848 he supported Van Buren for the Presidency. In 1851 he was counsel for the rescuers of the slave Shadrach in Boston. At the national convention of Free-Soil Democrats, held at Pittsburg in 1852, Hale was nominated for President, and George W. Julian, of Indiana, for Vice-President. The ticket polled 157,685 votes. At the expiration of his Senatorial term in 1853, Hale was succeeded by Charles G. Atherton; but after two years, which he spent in law practice in New York, the Legislature of New Hampshire having again an anti-slavery majority, he was elected to fill the vacancy caused by Senator Atherton's death. In 1858 he was reëlected, as a Republican, for a full term, and served until 1865, completing, in all, a service of sixteen years in the Senate. During the war he was a consistent supporter of President Lincoln's policy, and upon his retirement from the Senate he was appointed Minister to Spain, where he remained for four years.

HALE, Sir Matthew (1609-76). A distinguished English lawyer and judge, born at Alderley, in Gloucestershire, November 1, 1609. His paternal grandfather was a wealthy tradesman, while his mother was a member of the noble family of Poyntz of Acton. Left an orphan at the age of five, he was placed under the care of the Puritan Vicar of Walton-under-Edge, who prepared him for college. He entered Magdalen Hall, Oxford, at sixteen; at the age of twenty he was enrolled as a member of Lincoln's Inn, and entered upon the study of the law with great zeal and industry. During this period he is said to have worked sixteen hours a day, reading and rereading all the year-books, reports, and law treatises in print, delving into the records of the Tower of London and other repositories of antiquarian law. He also devoted considerable time to investigations in Roman law, in mathematics, in physics, chemistry, history, philosophy, medicine, and theology. Called to the bar in 1637, he quickly gained a large practice, and soon became prominent also in public affairs. While a Puritan in principle, he was not a partisan by nature, nor was he an anti-royalist. As long as possible he maintained a position of neutrality between the opposing factions in the State, having taken Pomponius Atticus as his political model. Upon the triumph of Parliament he signed the Solemn League and Covenant, sat in the Assembly of Divines at Westminster, tried to bring about a settlement between the King and Parliament, and after the death of Charles I. threw in his lot with the Commonwealth. Although, as a member of the Commons, he spoke in favor of subordinating 'the single person' to Parliament, the Protector made him a judge of the Court of Common Pleas in 1653. He declined a reappointment by Richard Cromwell. Having taken an active part in the restoration of Charles II., that monarch appointed him Chief Baron of the Exchequer in 1660, and made him a knight. Eleven years later Hale was advanced to the Chief Justiceship, which he held until failing health forced him to resign in February, 1676. Upon his withdrawal from public life he retired to his native Alderley, where he died the following Christmas.

Hale's fame as a lawyer and a judge is very great. Lord Campbell accounts him "the most eminent judge who ever filled the office of Chief Baron." His authority upon legal questions was deemed well-nigh infallible during the latter years of his life. His *Analysis of the Law* furnished Blackstone with an outline for his Commentaries. The other legal publications of Sir Matthew Hale which are most highly esteemed are: *De Jure Maris*; *Commentary to Fitzherbert's Natura Brevium*; and *A History of the Common Law*. He bequeathed many valuable manuscripts to Lincoln's Inn, where they are still treasured. Consult: Burnet, *Life and Death of Sir Matthew Hale* (London, 1682); Williams, *Life of Hale* (London, 1835); Campbell, *Lives of the Chief Justices* (Boston, 1873).

HALE, Nathan (1756-76). A Revolutionary patriot, who met his death under circumstances that have made him famous in American history. He was born at Coventry, Conn., graduated with high honors at Yale in 1773, taught school at

East Haddam from October, 1773, to March, 1774, and afterwards at New London until soon after the outbreak of the Revolutionary War, when (July 1, 1775) he became first lieutenant in a Connecticut regiment, commanded by Charles Webb. For a short time he was engaged on recruiting duty at New London, then served at the siege of Boston, and on September 1st became a captain-lieutenant. On January 1, 1776, he was formally commissioned a captain in the regular Continental service. In March, 1776, he started with Heath's brigade for New York, where soon afterwards (according to a doubtful tradition) he, with several picked men, captured by night a British provision sloop protected by the man-of-war *Asia*. While in the vicinity of New York he served as a member of a small harassing body known as Knowlton's Rangers. Early in September he volunteered to visit Long Island and New York, to secure some much-needed information concerning the enemy. Entering the British lines disguised as a Dutch school-teacher, he obtained the desired information, and was about to return, when, on the night of September 21st, he was recognized and captured. On the following morning he was hung as a spy, having previously, it is said, been denied the use of a Bible, or a visit from a minister, and having had the letters which he had written to his mother and his fiancée destroyed before his eyes. His last words were: "I only regret that I have but one life to lose for my country." There are statues of Hale in Hartford, Conn., and in City Hall Park, New York, the former by Gerhardt and the latter by Macmonnies. The best biography is that by Johnston (New York, 1901). Consult, also: Lossing, *The Two Spies, Nathan Hale and John André* (New York, 1886); Brown, *Nathan Hale, the Martyr Spy* (New York, 1899); and Holloway, *Nathan Hale, the Martyr Hero* (New York, 1899).

HALE, Nathan (1784-1863). An American journalist, the nephew of Nathan Hale the patriot, and the father of the Rev. Dr. Edward Everett Hale. He was born at Westhampton, Mass.; graduated at Williams College in 1804, studied law, and in 1810 was admitted to the bar in Boston. In 1814, with Henry D. Sedgwick, he began to edit the *Weekly Messenger*. In the same year Hale also bought the Boston *Daily Advertiser*, the first daily journal in New England. The *Advertiser* was originally Federalist in politics, and when that party went out of existence naturally gave its support first to the Whig and then to the Republican Party. Hale opposed the Missouri Compromise in 1820, and the Kansas-Nebraska Bill in 1854, and was a vigorous advocate of the colonization of Kansas by 'Free State' settlers. For many years he was a member of the State Legislature. He was one of the founders of the *North American Review* (1815) and of the *Christian Examiner* (1823).

HALE, Philip (1854—). An American music critic. He was born at Norwich, Vt., and from childhood was remarkable for his musical talent. He graduated at Yale in 1876, and was admitted to the bar at Albany in 1880. After his graduation his musical studies kept pace with his reading in law, Dudley Buck being his teacher. He was in Europe from 1882 to 1887, during which period he studied the organ with Haupt, Faiszt, Rheinberger, and Guilmant; composition with Urban, Bargiel, Rheinberger, and Guilmant; and the pianoforte with Raif and Scholz. Returning to the United States, he held the following appointments: 1879-82, organist of Saint Peter's, Albany; 1887-89, at Saint John's, Troy; 1889, of First Religious Society of Roxbury, Mass.; and 1887-89, conductor of the Schubert Male Chorus Club. From 1889 to 1897 he wrote musical criticisms for the Boston press, after which period he was the editor of the *Musical Record* of Boston, and a contributor to home and foreign musical journals. In 1901 he became editor of the *Musical World* of Boston.

HALE, Salma (1787-1866). An American historian and politician, born in Alstead, Cheshire Co., N. H. He learned printing in the office of a paper in Walpole, N. H., and at the age of eighteen became editor of the *Walpole Political Observatory*. In 1813 he moved to the neighboring town of Keene, where he studied law, but was not admitted to the bar until 1834. He was elected to Congress as a Republican (Democrat) in 1816, but declined a reëlection. During the following years he held several local political offices, and was secretary to the Boundary Commission appointed to determine the northeastern frontier of the United States. He interested himself in the causes of temperance, education, abolition, and Unitarianism, and while in Congress opposed the Missouri Compromise. His works include: *A History of the United States for Schools* (1838), which won a $400 prize and gold medal offered by the American Academy of Belles Lettres of New York; *The Annals of the Town of Keene* (1826); a number of other books, orations, and articles in newspapers and periodicals, as well as one or two translations.

HALE, Sarah Josepha (Buell) (1790-1879). An American editor and author, born in Newport, N. H. After the death of her husband in 1822, she turned to literature, and throughout the rest of her life was constantly engaged in writing and editing. She took charge of the Boston *Ladies' Magazine* in 1828, and conducted *Godey's Lady's Book* after its consolidation with the former in 1837. She advocated the social and intellectual advancement of women, and is said first to have suggested Thanksgiving Day as a national holiday. She was also active in raising money to complete the Bunker Hill Monument. She published many volumes of poems, some of which had great contemporary popularity, and edited several anthologies. She is said to have written the well-known "Mary Had a Little Lamb" for Dr. Lowell Mason in 1830, and published: *Northwood* (1827); *Sketches of American Character* (1833); *Traits of American Life* (1835); *Grosvenor: A Tragedy* (1838); *Alice Hay: A Romance in Rhyme* (1846); *The Judge: A Drama of American Life; Woman's Record, or Sketches of Distinguished Women from the Creation to the Present Day* (1853); *The Letters of Madame de Sevigné* (1856); *The Letters of Lady Mary Wortley Montagu* (1856).

HALE, William Gardner (1849—). An eminent American Latinist, born in Savannah, Ga. He graduated from Harvard in 1870, and studied at the universities of Leipzig and Göttingen. He served as tutor in Latin at Harvard from 1877 to 1880. In the latter year he was appointed professor of Latin at Cornell, and in 1892 accepted a similar appointment at the head

of the Latin department in the University of Chicago. His publications include: *The Cum-Constructions* (1887-88); *The Anticipatory Subjunctive in Greek and Latin* (1894); and various papers in classical journals. He took a prominent part in establishing the American School of Classical Studies at Rome, and was its first director (1895-96). He received the degree of LL.D. from Union College in 1895, and from Princeton University in 1896.

HÁLEK, hä'lĕk, Vítězslav (1835-74). A Bohemian poet, born at Dolinek, and educated at Prague. He devoted himself to journalism, but his talent was poetic and more especially lyric, and his collected lyrics, *Vpriodě* (1872-74) and *Večerní písně* (11th ed. 1891), rank him with Neruda, as among the foremost of the modern Czech poets. He also wrote the epic poems: *Krásná Lejla* (1859); *Alfred* (1858); *Mejrima a Husejn* (1859); *Goar* (1864); *Černy prápor* (1867); *Dědicové Bílé Hory* (1869); *Děvče z Tater* (1871); and *Pohádky z naší vesnice* (1873), in which lyric and epic mingle. His plays, *Carevič Aleksej*, *Zaviš z Falkenštejna*, and *Král Rudolf*, were fairly successful. A complete edition of his works, including some fiction, was published at Prague (1878-87) with a biography.

HALEN, ä'lăn, or **HALEM**, Don Juan van, Count of Peracampos (1790-1864). A Spanish general and patriot of Belgian descent, born on the Isla de Leon. He entered the navy when he was fifteen, and was present at the battle of Trafalgar. He took part in the rising against the French at Madrid (May 2, 1808), and at Ferrol was captured, but joined the French Army and became an artillery officer under Joseph Bonaparte (1809). In 1813 he went to Barcelona in Suchet's staff, joined a Spanish patriotic society, and treacherously surrendered Lérida, Monzón, and Mequinenza. Two years afterwards he was accused of complicity in a conspiracy against Ferdinand VII., and was imprisoned, but almost immediately released, and made a lieutenant. Again, in 1817, he was involved in Torrijo's plot, was put in the prison of the Inquisition, but escaped and fled to Russia. In 1821 he returned to Spain and fought under Mina. He took part in politics and was prominent in the Belgian Revolution of 1830, being placed at the head of the insurgent forces, but soon after the expulsion of the Dutch from Brussels he quarreled with De Potter and resigned. Once more in Spain (1834), he was appointed Córdova's adjutant, and served with success against the Carlists (1836). In 1840 he was made Captain-General of Catalonia. In 1842 he put down the uprising in Barcelona, but the opposition to Espartero had grown too strong in 1843, and he escaped to England in July. He returned to Spain in 1850, and in 1854 became president of the Supreme Navy and Army Court. He wrote *Relación de su candividad en los calabozos de la Inquisición, su evasión y emigración* (1827), and *Les quatre journées de Bruxelles* (1831).

HALES, hālz, Alexander of. See Alexander of Hales.

HALES, John (1584-1656). A Church of England divine. He was born at Bath, April 19, 1584; educated at Oxford; became fellow of Merton, 1605; fellow of Eton, 1613; canon of Windsor, 1639; but was ejected by the Parliamentary committee from his canonry, 1642, and his Eton fellowship, 1649. He died at Eton, May 19, 1656. In 1618-19 he was present in the Synod of Dort (q.v.), and has given an interesting account of it. The discussions changed him from Calvinism to Latitudinarianism. His learning, popularity, and practical sense were so admired by his contemporaries that they thought posterity could not possibly forget him, and his first editor issued his works under the caption, *Golden Remains of the Ever Memorable Mr. John Hales* (London, 1659); a fuller collection appeared in Glasgow (1765, 3 vols.). His most famous single work is his *Tract Concerning Schism and Schismatics*, written in 1636, but not printed till 1642.

HALES, Stephen (1677-1761). An English physiologist and inventor. He was born at Beckesbourn, in Kent, and died at Teddington, in Middlesex, in 1761. He entered Corpus Christi College, Cambridge, in 1696, was elected fellow in 1702, and having taken holy orders, was presented about 1710 to the perpetual curacy of Teddington. He was a fellow of the Royal Society and trustee for the Colony of Georgia. He was the author of *Statical Essays*, the first part of which was published under the title of *Vegetable Staticks, or an Account of Some Statical Experiments on the Sap of Vegetables* (1727), and which rapidly acquired so high a reputation as to be translated into French, German, Dutch, and Italian, and may be considered the starting-point of our true knowledge of vegetable physiology. A second part of this work, under the title *Hæmostaticks*, and treating of the circulation of the blood, appeared in 1733. In addition to valuable researches in botany and physiology, he contributed numerous memoirs to the *Philosophical Transactions* on ventilation, on the method of keeping water fresh, on electricity, on the analysis of the air, etc. Ventilating machines which he invented were introduced into London prisons, and were found most efficacious in diminishing mortality among the prisoners. His system was also adopted in France with similar good results. He wrote a number of essays on the evils of the drinking of spirits, which were extremely popular and widely circulated in the cause of temperance. In his experiments with gases he collected them over water, a method which was extensively employed by Priestley and other workers in the field.

HA-LEVI, Judah. A Jewish poet and scholar of the eleventh and twelfth centuries. See Judah, Ben Samuel.

HALÉVY, ä'lä'vē', Jacques François Fromental (1799-1862). A celebrated French dramatic composer, born in Paris, of Jewish parentage. After a little preparatory study he entered the Solfège class of the Paris Conservatory in 1809. The following year he undertook the study of the pianoforte under Charles Lambert, and in 1811 of harmony under Berton. Five years in the study of counterpoint under Cherubini followed, after which in 1816 he won the Prix de Rome, with a cantata, *Herminie*. His time in Italy was devoted principally to operatic composition, and after considerable difficulty he succeeded in having the result of his labors, the opera *L'artisan*, presented in Paris in 1827. The public, however, received it coldly, and refused the composer any recognition until, in

1834, his successful treatment of Hérold's unfinished opera, *Ludovic*, which he completed, won general commendation from critics and public alike. *La Juive*, produced in 1835, marked his first triumph, and was followed six months later by the equally successful *L'Eclair*. *Guido et Ginevra* (1838) met with but an indifferent reception, a fate which pursued *Les treize* (1839) and *Le Drapier* (1840). With *La reine de Chypre* (1841) his first success was repeated. He held many important positions, beginning as a teacher at the Conservatory in 1827, and being appointed, at the same school, professor of theory in 1833, and of composition in 1840. He also served as accompanying pianist at the Théâtre Italien (1827), and as *chef du chant* at the Grand Opéra (1829). Among his pupils were Gounod, Victor Massé, Bizet, Bazin, and Henri Duvernoy. As a composer, he suffered from Meyerbeer's overshadowing popularity, although he is regarded as possessing a far greater depth of sentiment than his more successful confrère. Certain it is that he did not consult the public, and in consequence his music was frequently misunderstood. His masterpiece is undoubtedly *La Juive*, which is deservedly recognized as a classic. He was elected permanent secretary of the Académie des Beaux-Arts in 1854. He died in Nice, but was buried in Paris. For his life, consult Léon Halévy, *F. Halévy, sa vie, ses œuvres* (Paris, 1863), which contains a full account of all his numerous compositions.

HALÉVY, Joseph (1827—). A French Orientalist, born at Adrianople, Turkey. He studied at Jewish colleges in Adrianople and Bucharest, and attracted some attention by his Hebrew verse. In 1868 he was commissioned by the Alliance Israélite Universelle to study conditions among the Falashas of Abyssinia, and in 1869-70, under the direction of the Académie des Inscriptions, traveled in Yemen, where he obtained copies of 686 inscriptions, chiefly Sabæan and Himyaritic, later published in his *Rapport sur une mission archéologique dans le Yémen* (1872). He was appointed adjunct professor of Ethiopic at the Ecole des Hautes Etudes, and assistant librarian of the Asiatic Society. As an Assyriologist, he is known for his contention that the Akkadian people and literature never existed, and that their so-called writing was a cryptography invented by the Babylonian priests to lend greater secrecy to their compositions. Halévy has also been prominent as a biblical critic. His publications include further: *Voyage au Nedjrân* (1873); *Etudes sabéennes* (1875); *Etudes berbères, épigraphie lybique* (1875); *La prétendue langue d'Accad, est-elle touranienne?* (1875); *Recherches critiques sur l'origine de la civilisation babylonienne* (1876); *Mélanges de critique et d'histoire relatifs aux peuples sémitiques* (1883); and an *Essai sur l'origine des écritures indiennes* (1886). A series of *Recherches bibliques*, published by him in the *Revue des Etudes Juives* from 1886 to 1892, was continued from 1893 in the *Revue Sémitique d'Epigraphie et d'Histoire Ancienne*, which he founded in the beginning of that year. He also wrote much for the *Revue Critique* and the *Journal Asiatique*.

HALÉVY, Léon (1802-83). A French man of letters, born in Paris, brother of Jacques François Halévy, the composer. He became a supporter of Saint-Simon, and one of the founders of *Le Producteur*. In 1831 he was appointed adjunct professor of literature in the Ecole Polytechnique, and from 1837 to 1853 was chief of the bureau of historical monuments in the Ministry of Public Instruction. His works include: *Recueils de fables* (1844 and 1856) and *La Grèce tragique* (1846), both of which were crowned by the French Academy; *Vie de François Halévy* (1862); and several dramatic works, including two tragedies, *Le Czar Démétrius* (1829), and *Electre* (1864).

HALÉVY, Ludovic (1834—). A French dramatist, born in Paris. He achieved great popularity during the Second Empire for work in collaboration with Henri Meilhac (q.v.) in light comedy, and by writing Offenbach's most popular librettos. Their first great success was *La belle Hélène* (1865), followed by *Barbe bleue* (1866); *La grande duchesse* (1867); *La Périchole* (1868); *Carmen* (1875); and *Le petit duc* (1878). They wrote also during this period farces of unusual levity, and toward the close of the Empire essayed the serious though sensational drama in *Frou-Frou* (1869), one of the greatest theatrical successes of the century. From the literary point of view, the best of their joint work is in realistic and farcical satires, such as *Tricoche et Cacolet* (1872); *La boule*, or, in still lighter vein, the sparkling effervescing one-act play *Réveillon*, and the clever but unsavory *Toto chez Tata*. Both Meilhac and Halévy worked also independently. Here Halévy has devoted himself almost wholly to novelistic satire and idyllic sketches. Of the former, the best are the three astonishingly clever volumes on the Cardinal family: *M. et Mme. Cardinal* (1873); *Les petites Cardinal* (1880); *La famille Cardinal* (1883), whose head is a "corrupt Puritanic Prudhomme of vice." Of the latter, *L'abbé Constantin* (1882) is world-renowned for its fresh charm, and the early part of *Criquette* (1883) is hardly less winning in its picture of a theatrical Parisian gamin. The rest of Halévy's fiction is not significant. He was elected to the Academy in 1886. The dramatic works (*Théâtre Complet*) of Halévy and Meilhac are in course of publication (5 vols., Paris, 1901). Consult Matthews, *French Dramatists of the Nineteenth Century* (3d ed., New York, 1901).

HAL'FA. A name for esparto (q.v.), a Spanish grass used in paper-making. See Feather Grass.

HALF-APE. A book name for a lemur (q.v.).

HALFBEAK. One of a group of synentognathous marine fishes, related to the pikes and needlefishes, and constituting the family Hemiramphidæ, which are conspicuously distinguished by the shortness of the upper half of the beak-like jaw, the lower mandible being variously prolonged beyond it. (See Plate of Needlefish, Pikes, etc.) All are small, about a foot in length, handsomely colored, and mostly remain near shore in warm latitudes. They swim near the surface, often in large schools, and feed on algæ; they are excellent to eat. The common Spanish name in the West Indies is 'balao' (dancer), and some species are called 'pajarito' and 'escribano'; while one beautiful and rather peculiar form (*Chriodorus atherinoides*), abundant at Key West, Fla., is called 'hardhead.'

HALF-BLOOD. In English and American law, the relationship of persons who have one

parent only in common, as half-brothers, etc. When two persons have the same father, but not the same mother, they are said to be *consanguineous;* when they have the same mother only, they are called *uterine* brothers or sisters. In the succession to real property in England, the half-blood relations by the father's side succeed after the full-blood relations; and next, but at a considerable interval, the half-blood relations by the mother's side. This is a modification of the common-law rule, however, as by that law persons of the half-blood were excluded entirely from the line of descent and were not capable of inheriting from each other. In Scotland, also, the half-blood consanguineous succeed to heritable estates in the same way, though not in identically the same order; but the half-blood uterine never succeed in any event. In England, as regards personal estate, the half-blood on both sides succeed indiscriminately, and share equally with the full-blood. But in Scotland the half-blood succeed to movable property only after all the full-blood and their descendants are exhausted, and then the half-blood by the father's side succeed in exclusion of the half-blood by the mother's side, who do not come in until the succession reaches a distant point, viz. where the nearest relations are uncles and aunts paternal, or their descendants, in which case only the half-blood uterine after the mother's death take half the property, and the paternal relatives the other half.

The common-law disability of the half-blood formerly existed in the United States; but has everywhere been wholly or partially removed by statute. In some States the modern English rule has been adopted, brothers or sisters of the half-blood succeeding after those of full blood, while in others no distinction whatever is made between them. It is to be observed that the distinction between the whole and half blood exists only in determining the relationship of brothers and sisters to one another and for the purpose of determining the descent of property from one of these to the other, all children being equally related to a common parent. See CONSANGUINITY; DESCENT.

HALF-BREEDS. A political nickname applied, in 1881 and the years immediately following, to members of a faction in the Republican Party in the State of New York, which favored the Administration in the controversy between President Garfield and Senators Platt and Conkling, and opposed the regular Republican candidate for the Governorship of the State, Folger, thus bringing about the election of the Democratic candidate, Grover Cleveland. The name was given in derision, as denoting those who were but half Republican, by the members of the opposite faction denominated 'Stalwarts' (q.v.). The term was also used to some extent in other States.

HALF MOON, THE. The name of the ship in which Henry Hudson, commissioned by the Dutch East India Company, in 1609, undertook his voyage in search of the Northwest Passage, and in which he skirted the New England coast and sailed up the Hudson River.

HALF MOON, THE. A former tavern in Aldersgate, London, once the resort of many literary men. Its present designation, 'Shakespeare's House,' is without foundation.

HALF PAY. See PAY AND ALLOWANCES.

HALFSNIPE. The British 'jacksnipe' (q.v.).

HALFWAY COVENANT. The designation given to a peculiar modification of church-membership which arose in early New England. According to the view prevalent in the Congregational churches of New England at their foundation, the only proper members of a local church were men and women of personal Christian faith and experience, and their minor children. The growth to maturity of the children of the first settlers raised the question of the permanent ecclesiastical status of such children. Were they still members, though lacking a personal Christian experience? The question was answered in the affirmative by many early New England ministers, by a ministerial convention which met at the request of Connecticut and summons of Massachusetts in 1657, and by a synod of the Massachusetts churches in 1662. It was held by them that such as were members themselves in infancy by reason of their parents' membership were still sufficiently members when of mature years, even if not of conscious Christian experience to transmit the same degree of membership in turn to their children, and to have their children baptized. To bring their children for baptism they must enter into a 'covenant' with the church to submit to its discipline, and give an intellectual assent, at least, to the main truths of Christianity. In the absence, however, of a personal Christian experience they were not fit to partake of the communion. Hence the name 'halfway,' or halfway into full church membership. The ascription of a political significance to the system (increased access to the franchise) is without foundation. The system was the occasion of long controversy in New England; it was opposed by Jonathan Edwards and his disciples, and died out in the early part of the nineteenth century. Consult: Walker, *Creeds and Platforms of Congregationalism* (New York, 1893).

HAL'HED, NATHANIEL BRASSEY (1751-1830). An English Orientalist, born at Westminster. He studied at Christ Church, Oxford, and afterwards went to India, where, at the instance of Warren Hastings, he translated a digest of the Sanskrit law-books, under the title *A Code of Gentoo Law*, etc. (1776). This work went through three editions, and was translated into French in 1778. After his return to England in 1785 he was elected to Parliament, of which body he continued a member until 1795. His other publications include: *A Grammar of the Bengal Language* (1778); and *A Narrative of the Events . . . in Bombay and Bengal Relative to the Mahratta Empire* (1779).

HALIBURTON, THOMAS CHANDLER (1796-1865). A British-American humorist, who wrote under the pen-name of 'Sam Slick.' He was born at Windsor, N. S., and was educated at King's College, in his native town. He was called to the bar in 1820; was raised to the bench of the Common Pleas in 1828; and became judge of the Supreme Court in 1842. In 1856 he retired from the bench, and took up his residence in England. In 1858 he received the degree of D.C.L. from Oxford, and in 1859 entered Parliament as Conservative member for Launceston. Haliburton is best known as the author of *Sam Slick*, the name of a Yankee clock-maker and peddler, whose quaint drollery, unsophisticated wit, knowledge of human nature, and aptitude in

the use of what he calls 'soft sawder,' have given him a fair chance of immortality. In a subsequent series the author brings Sam Slick to England as an attaché of the United States Legation. These sketches, begun in the *Nova Scotian* newspaper in 1835, appeared in three series (1837, 1838, 1840). Copied into other papers, they were for a long time popular in America and in England, and were translated into several Continental languages. Among Haliburton's numerous other works are: *The Letter-Bag of the Great Western; Wise Saws and Modern Instances; Nature and Human Nature; Bubbles of Canada; Rule and Misrule of the English in America;* and *An Historical and Statistical Account of Nova Scotia.* Consult *Memoir*, by Crofton (Halifax, 1889).

HALIBUT (from ME. *haly*, Eng. *holy* + ME. *butte*, Eng. *but*, Ger. *Butte*, Swed. *butta*, flounder; so called as eaten especially on holy days). The largest and most important of the flatfish. This species (*Hippoglossus hippoglossus*) is elongated and rather thick in form (see colored Plate with FISH AS FOOD) and lies on its left side, which is white, while the right side, uniform dark brown in color, with very small smooth scales, is uppermost and bears both the large eyes. The capacious mouth is symmetrically placed, as also are the ventral fins. Specimens sometimes reach huge size—seven or eight feet in length—and weigh 400 pounds or more; but these are believed always to be females, and their flesh is poor. A weight of 75 pounds or less is more usual, and such fish are in better condition. Little ones are called 'chicken halibut' by the New England fishermen. The halibut abounds in all northern seas at moderate depths, extending as far south as it can find water only a few degrees above the freezing-point; hence it ranges farther in winter than in summer, infrequently to the region of New York, on the eastern, and San Francisco on the western coast; or to the English Channel in Europe. Formerly it was extremely numerous in Massachusetts Bay and on George's Bank, but since about 1850 has become scarce south of the Banks of Newfoundland, where it haunts the skirts of the Banks, and must year by year be followed into deeper and deeper water (300 to 500 fathoms) as those in the shallower places are depleted. The halibut are voracious, and, despite their bulk, active and fierce; their principal food is believed to be mollusks and crustaceans of various kinds, but they chase and devour all sorts of fishes, and sometimes follow the schools of Arctic capelin close inshore, or pursue fishes at the surface, disabling them with strokes of the tail as well as seizing them in their mouths. The halibut, in its turn, is preyed upon by seals, the white whale, various large sharks, and, when young, by its own kind. The females become heavy with roe in the latter part of summer, and then seek comparatively shallow water in which to spawn.

Halibut are caught by the same methods as are cod. (For particulars see FISHERIES.) Two other closely related fishes are the arrow-toothed halibut (*Atheresthes stomias*) of the North Pacific, about two feet in length and largely caught and utilized in the Aleutian Islands; and the Greenland halibut (*Reinhardtius hippoglossoides*), which is yellowish brown, may reach a very large size, and inhabits the Arctic Atlantic, but not numerously.

HAL'ICARNAS'SUS (Lat., from Gk. Ἁλικαρνασσός). A Greek city of Caria, in the southwest of Asia Minor, on the north shore of the Ceramic Gulf. It was founded by a colony from Trœzen, and was one of the cities of the so-called Doric Hexapolis, from which confederacy, however, it was eventually excluded. The Ionian element in the population seems to have been large, for in the fifth century B.C. the official dialect was Ionic. Close to Halicarnassus was the Carian city Salmacis, which formed with it one community, and later became its chief and almost impregnable citadel. Under the Persian rule it passed to the dominion of the tyrant Lygdamis, whose daughter Artemisia (q.v.), while ruling for her infant son, commanded a squadron in the fleet of Xerxes (B.C. 480). With help from Samos the city threw off the Persian rule, and became, with other Carian cities, for a time a member of the Athenian League. Later it again fell under Persian control, and in the fourth century we find it the capital of the rulers of Caria. The most celebrated of these was Mausolus, son of Hecatomnus, in whose honor his sister and wife, Artemisia, erected the great mausoleum (q.v.). Alexander the Great destroyed the lower town, but could not capture Salmacis. From that time the town was comparatively insignificant. Halicarnassus was the birthplace of two of the most eminent of the Greek historians, Herodotus and Dionysius. Early in the fifteenth century the Knights of Saint John erected here a strong citadel, to which they gave the name of the Petronion, in honor of Saint Peter. From this is derived the modern name *Budrun*. For an account of the discovery of the ancient remains of the city, and of the disentombment of the mausoleum, see MAUSOLEUM.

HALIDON (hăl'ĭ-don) **HILL.** A height of land in England, a short distance northwest of Berwick-upon-Tweed, noted as the scene of a bloody conflict between the English and the Scots, July 19, 1333. Edward III., in support of the claims of the fugitive Edward Baliol (q.v.) to the crown of Scotland, had advanced to the borders with a large army and laid siege to Berwick. The Scotch forces under the Regent of Scotland, Archibald Douglas, Lord of Galloway, surnamed 'the Tyneman,' marched to the relief of Berwick, and found the English drawn up on the north side of Halidon Hill. Regardless of fatigue, the Scots immediately advanced to the attack, suffering severely from the English archers while crossing the morass which skirts the base of the hill. They nevertheless struggled onward, and succeeded in mounting the hill, but were thrown into confusion by a charge of the English, and were totally routed. The English cavalry and the Irish auxiliaries committed great slaughter among the fugitives. According to the Chronicle of Lanercost, Archibald Douglas, "seven earls, 27 bannerets, and 36,320 foot soldiers" fell. The English loss was comparatively small. The town of Berwick immediately surrendered, and Edward Baliol for a short time regained possession of the throne. See SCOTLAND.

HAL'IFAX. The capital of Nova Scotia, Can., on the southeast or outer coast of the peninsula, in latitude 44° 39′ N., and longitude 63° 35′ W. (Map: Nova Scotia, F 5). It is built on the east slope of a small peninsula in Halifax

harbor. The harbor is one of the finest in the world. It is entered from the south, extends northward about six miles, terminates in a magnificent sheet of water called Bedford Basin, and offers at all times an easy access and safe anchorage to vessels of any magnitude. It has two entrances, made by M'Nab's Island, of which only the western is navigable for vessels of large tonnage. Halifax is the chief naval station for British North America, with dockyards, a dry dock, and complementary establishments. The head offices of the Nova Scotia Railway and the Nova Scotia Electric Telegraph Company are situated here. Halifax is also the eastern terminus of the Canadian Pacific Railway, and of the Inter-Colonial Railway of Canada. The port has nearly all the foreign trade of the colony. Its export trade in agricultural produce, lumber, fish, and furs is large. The industrial establishments comprise iron-foundries, machinery, agricultural implement, cotton, woolen, tobacco, paper, and soap manufactories, sugar-refineries, tanyards, distilleries, and breweries. The city is the seat of various foreign consuls, including a consul-general of the United States. It is an important military post, defended by eleven forts and batteries, one of which, the Citadel crowning the hill on which Halifax is built, is said to be, after Quebec, the strongest fortification in America. Halifax and Quebec are the only places in Canada where British troops are stationed. The extensive and handsome barracks overlook the harbor. The city, with its suburbs, extends along the slope of a hill, and covers an area three miles long by one mile wide. The streets are well laid out at right angles, and granite and freestone have replaced wood for building purposes. The principal edifices are the Dominion Building, containing the post-office, customs department, and a museum, the Provincial Parliament building, Government House, military hospital, admiralty house, lunatic and blind asylums, provincial penitentiary, court-house, exchange, theatre, and Y. M. C. A. building. Halifax is the seat of the Anglican Bishop of Nova Scotia and Prince Edward Island, and of the Roman Catholic Archbishop of Halifax, with their cathedrals. It also has numerous churches. Among its educational institutions are Dalhousie College and University, unsectarian and well equipped with faculties of arts, sciences, law, and medicine; 28 public schools, a ladies' college, a convent, and a Presbyterian theological college. The city is lighted by electricity, has street railways, public gardens where band concerts are given, attractive parks, a fine water-supply, and a modern system of sewerage. It has become a favorite summer resort owing to the beauty of its surroundings, its sanitary conditions, and the bracing climate. The city sends two representatives to the Dominion House of Commons, and three to the Provincial Legislature. Founded in 1749, and named in honor of the Earl of Halifax, the contemporary president of the British Board of Trade, it supplanted Annapolis in 1750 as the seat of government. During the Revolutionary War it was one of the chief British bases of supply. Population, in 1891, 38,495; in 1901, 40,787.

HALIFAX. A town and county borough in the West Riding of Yorkshire, England, on the Hebble, seven miles southwest of Bradford (Map: England, E 3). It has exceptional facilities for water and railway transportation, which contribute to the importance of its woolen and cotton industries. It also has iron, machine, and chemical works, and neighboring coal-mines and stone-quarries. There are numerous charitable institutions and public and private educational establishments, which include the Heath Grammar School, founded in 1585, and the Blue Coat School. The standard of municipal administration is high. The town maintains free libraries, markets, slaughter-houses, a fire-brigade station, and a cemetery; its owns its water, gas, and electric works, tramways, bathing establishments, paving-stone quarry, and has a modern system of refuse and sewage disposal. Halifax sends two members to Parliament. Mentioned in the twelfth century, it was an obscure hamlet until the fifteenth, when the settlement of Flemish artisan refugees inaugurated its growth and prosperity. It was long under manor rule, and did not receive its charter of incorporation until 1848. Population, in 1891, 97,700; in 1901, 105,000.

HALIFAX, Charles Montagu, Earl of (1661-1715). An English statesman and financier. He was a grandson of Henry, first Earl of Manchester, and was born probably at Horton, in Northamptonshire, April 16, 1661. He was educated at Westminster School and Trinity College, Cambridge. A laudatory poem on Charles II. in 1685 first brought Montagu into public notice. Two years later appeared the parody on Dryden's *Hind and Panther*, entitled *The Town and Country Mouse*, of which he was joint author with Matthew Prior. He disappeared almost entirely from the field of literature after the appearance of his satire, save as the patron of Addison and other men of letters. He was elected to the Convention Parliament in 1689, where he voted for the declaration that James II. had abdicated, and that the throne was thereby vacant. He retained his seat in William III.'s first Parliament, and was appointed in 1692 a commissioner of the treasury. On December 15th of the same year he proposed in the House of Commons to raise a million pounds sterling by way of loan, a measure which, adopted, made the beginning of the English national debt. In the spring of 1694 money was again wanted, and Montagu was ready to supply it. This time he did so by originating a national bank, a scheme for which had been laid before the Government by William Paterson three years before. The capital was to be £1,200,000, and the shareholders were to be called the Governor and Company of the Bank of England. The bill for this was ultimately passed; the result was entirely successful, and Montagu became Chancellor of the Exchequer. His next work was the recoinage of 1695, which he carried out successfully, appointing Newton, of whom he was a lifelong friend and patron, warden of the mint, and raising a tax on windows to pay the expense, instead of the obnoxious impost called hearth-money. In 1697 he became First Lord of the Treasury, but soon, being unpopular on account of his arrogant manners, he was obliged to bestow upon himself the auditorship of the Exchequer and resign his higher offices. Harley insisted on his withdrawal from the Commons, and he became Baron Halifax. He was impeached in 1701 before the House of Lords for breach of trust while Chancellor of the Exchequer, and again in 1703, but the proceedings fell to the ground. During the whole of Anne's

reign Halifax remained out of office, but was active in promoting the union with Scotland and the Hanoverian succession. On the Queen's death he was appointed a member of the temporary council of regency, and on George I.'s arrival became an earl and First Lord of the Treasury. His rule lasted only nine months, being terminated by his death, on May 19, 1715. For Halifax's literary activity, consult his *Life and Miscellaneous Works* (London, 1715); for his political career, consult: Macaulay, *History of England* (New York, 1856-62); Ranke, *History of England* (Oxford, 1875).

HA'LIOTI'DÆ. See ABALONE.

HALIR, hä'lēr, KARL (1859—). A Bohemian violinist, born at Hohenelbe. He studied at the Prague Conservatory, and in 1874-76 with Joachim in Berlin. In 1888 he was appointed leader of the Court Orchestra at Weimar. In 1894 he settled in Berlin, where he became a member of Joachim's quartet and a teacher in the conservatory. An American tour (1896-97) was extremely successful. Halir is in the front rank of modern European violinists.

HA'LITE (from Gk. ἅλς, *hals*, salt). A mineral composed of sodium chloride. It crystallizes in the isometric system; has a vitreous lustre, and is white in color, sometimes tinged with yellow, red, blue, and purple. It is found in irregular beds in rocks of various ages, usually associated with calcite and gypsum, together with clay and sandstone; also forming salt springs, and in the water of the oceans and lakes. The principal deposits in Europe are at Wieliczka, Poland, and at Stassfurt, Germany; it is also found at various localities in the Carpathian Mountains, the Austrian and Bavarian Alps, in Western Germany, the Vosges, and the Jura Mountains, and in Cheshire, England. In the United States it occurs in the following States, given in the order of their apparent importance: Michigan, New York, Kansas, California, Louisiana, Illinois, Utah, Ohio, West Virginia, Nevada, Pennsylvania, Virginia, Kentucky, Texas, and Wyoming. The rock salt deposits of Petite Anse, New Iberia, and other localities in Louisiana, are well known. See SALT.

HAL'ITHE'RIUM (Neo-Lat., from Gk. ἅλς, *hals*, sea + θηρίον, *thērion*, diminutive of θήρ, *thēr*, beast. A fossil dugong, of which remains are found in rocks of Miocene age in Europe. See SIRENIA; DUGONG; MANATEE.

HALL, häl. A town in the Austrian Crownland of Tyrol, situated on the Inn, which is here navigable, six miles east of Innsbruck (Map: Austria, B 3). The parish church, built in 1271, the fifteenth-century Rathaus, the Franciscan convent, and the Münzthurm, are the chief buildings. About nine miles north of the town is the Salzberg, with salt-mines, from which salt in the form of brine is conveyed in wooden pipes to the pans of Hall. Hall also manufactures chemicals, felt hats, buttons, paper, cloth, and chicory. Population, in 1890, 5800; in 1900, 6200. Hall was a flourishing town in the Middle Ages, but has declined greatly on account of wars and earthquakes.

HALL, or **SCHWÄBISCH** (shvā'bĭsh) **HALL.** An old town of the Kingdom of Württemberg, Germany, situated on the Kocher, 48 miles northeast of Stuttgart (Map: Germany, C 4). It is poorly built, but has some interesting ancient buildings. The Church of Saint Michael, constructed in 1427-1525, contains a fine altarpiece. The Church of Saint Catharine, on the left bank of the Kocher, dates from the fourteenth century. Hall has salt-works and saline baths, and carries on a trade in grain and cattle. The manufactures include iron articles, machinery, cotton yarn, leather, etc. Hall, mentioned as early as 887, owed its importance in ancient times to its saline springs. It was raised to the rank of an Imperial town in 1276, and it was in its mint that the first coins known as *Hellers* were struck. It came into the possession of Württemberg in 1802. Population, in 1890, 9000; in 1900, 9225.

HALL (AS. *heall, heal,* Icel. *höllr,* OHG. *halla,* Ger. *Halle;* probably connected with AS. *helan,* obsolete Eng. *heal,* OHG. *helan,* Ger. *hehlen,* Lat. *celare,* Gk. καλύπτειν, *kalyptein,* to hide, OIr. *celim,* I hide). A name given to a large inclosed space in the form of a single apartment, whether it stands alone in a separate structure or is in a larger building of which it is merely a part. The term is even used, by extension, of the feudal mansions or manor houses of which such a large room was the main part. Finally, in modern architecture, by a misuse of the term it has come to be applied to the common room out of which the others open.

In the history of architecture the term hall is applied to such interiors as the hypostyle hall of an Egyptian temple, the *apadans* of a Persian palace, or the *tepidarium* of the Roman thermæ, and we call mediæval churches with a single nave, or with several naves of equal height, hall churches. But the origin of the term is both secular and northern. The earliest Saxon buildings we have any record of are the palaces of the kings, and these seem to have consisted of one large hall, in which the king, his courtiers, and all his retainers dwelt together, and one other chamber, in which the king and his hearthmen slept, while his retainers slept in the hall. The same custom prevailed among other early Norse and Germanic tribes. The Normans built their houses on the same plane, with the hall and one solar (q.v.) or sleeping apartment. The same arrangement prevailed with slight modifications during the twelfth and thirteenth centuries. Then and later the hall, while part of the group of manor buildings, was often a separate structure, with its independent roof, as at Stokesay and Oakham castles. In the fourteenth and fifteenth centuries, when the country was more settled and prosperous and manners had become more refined, more numerous rooms were necessary. The hall, however, still retained its place as the chief apartment. In it the King or the lord of the manor entertained his retainers and guests, and performed all the acts of feudal life. At one end of the hall was a raised platform or dais, on which the table of the lord of the manor was placed, and where his more honored guests sat. The retainers sat at a table in the lower part of the room. The halls were more frequently roofed than vaulted, and these roofs were very carefully and elegantly constructed, as many still

remaining show. The hall of the King's palace, now called 'Westminster Hall,' built by William Rufus and restored by Richard II., is the finest example in England, being 300 feet long and 100 feet broad. Those in the Imperial and royal palaces of Germany, as at Goslar, are the earliest and best preserved of their class.

The use of such halls spread from feudal society to other branches of life, especially corporate life in the Gothic and Renaissance periods. There are three principal classes of such halls—the communal halls, the guild halls, and the college halls. The political organization of the free mediæval cities required large meeting-places for their governing bodies; they sometimes occupied the entire ground floor, as at Udine, either open or inclosed; sometimes the second floor above a basement, as at Padua (the largest in existence). The entire structure was often most imposing, as at Siena, Perugia, Gubbio, Florence, Cremona. (See PALACE.) They fell into disuse with the fall of liberty in the Renaissance. The second class, the guild halls, without being generally as imposing in Italy (except, for instance, that at Florence), attained great importance in Flanders and Northern France. Here the 'Halles' were the heirs of the great Roman markets. Each great corporation possessed one, and where the city was governed by them the communal belfry often rose from its summit, as in the halls of Ypres, Bruges, and Arras. Many of these great structures remain: the Butchers' Hall (*Halle à la Viande*) at Ghent, Ypres, and Antwerp; the Bakers' Hall (*Halle au Pain*) at Brussels; the Fishmongers' Hall (*Halle aux Poissons*) in many towns; the Cloth Hall (*Halle aux Draps*) at Ghent, Bruges, Louvain, and Brussels; the Bankers' Hall (*Bourse*) at Antwerp. The finest of all is the hall at Ypres, built between 1201 and 1304. Some are open, on piers, especially in the south of France, as at Fijeac and Cordes; others, in France also, are built entirely of wood, as at Villeneuve and Evron. Sometimes they are built around a court, as at Antwerp; but the usual type is an oblong stone structure with wooden timbered roof or vault, in one, two, or three aisles, often with a second-story gallery. The various colleges at Oxford and Cambridge and other universities had common halls, which were often of great architectural dignity and beauty, several of which remain almost unchanged. The history of the term, therefore, shows that it applies to a large meeting-place, whether of a feudal family, a corporation, or an entire community.

In more recent times it has been logically applied to large places where any audience is gathered together, especially for musical and other entertainments, such as Saint George's Hall in Liverpool, or Carnegie Hall in New York. Some of the meeting-places notable in our own history bear this name, such as Faneuil Hall in Boston, and Nassau Hall in Princeton. The large buildings at American universities, whether dormitories or recitation buildings, even when they contain no large main apartment, are generally called halls.

HALL, or HOSTEL. An institution in English universities fast dying out, chiefly by absorption into colleges. It was the earliest, and for a long time the only organization for the support of students outside the foundations of the religious orders. For the establishment of a hall, a few students by mutual agreement rented a house, chose a principal, at first generally one of their number, later a master, and applied to the university for recognition. The halls were held on lease, the rent being fixed at intervals, generally, of five years by four taxers, two masters and two citizens, and houses once occupied by students could not be let to a layman, so long as a clerk would take it. The halls were under the supervision of the university, which had the right of visitation, and gradually acquired considerable authority over them. For centuries the halls greatly outnumbered the colleges, and even after the rise of colleges many halls remained as independent establishments, largely as the residences of wealthier students. Some received endowments and became not unlike small colleges; but most kept to the original idea of a hall, that of an independent self-governing community of students living at their own expense. The rise of colleges where support was given students was the death-blow to the hall idea, and many colleges owed their origin to the absorption of older halls. This process of absorption is still going on, and the halls are now almost extinct, even those now remaining being destined to union with neighboring colleges after a longer or shorter period. See SAINT EDMUND HALL.

HALL, ANNA MARIA (*née* Fielding) (1800-81). An English novelist, born in Dublin. Her mother, left a widow, took her to London, where she was educated. In 1824 she married Samuel Carter Hall, editor and author. She became known by *Sketches of Irish Character* (1829), which was followed during the next fifty years by about fifty distinct publications, consisting mostly of short stories and novels. Many of them first appeared in magazines. A good specimen of her delineation of Irish character—almost equaling Maria Edgeworth's—is *Marian* (1840). Another side of her talent is represented by *Midsummer Eve, a Fairy Tale of Love* (1848). She also succeeded in gaining popular favor by several plays. *The French Refugee* (1836), for example, ran ninety nights at Saint James's Theatre. She was an active and practical philanthropist. Consult Hall, *Retrospect of a Long Life* (London, 1883).

HALL, ARTHUR CRAWSHAY ALLISTON (1847—). An American bishop, born at Binfield, in Berkshire, England. He was educated at Christ Church College, Oxford, and entered the Cowley Fathers, or Society of Mission Priests of Saint John the Evangelist, a community bound to poverty, chastity, and obedience. In 1872 he became assistant pastor of the Church of the Advent in Boston, and, in 1882, minister to the Mission Church of Saint John the Evangelist in the same city. He was recalled to England in 1891, was elected Bishop of Vermont in 1893, and after much ecclesiastical discussion was consecrated in February, 1894, after being released from the Cowley Order. He wrote: *Confession and the Lambeth Conference* (1879); *Meditations on the Creed* (1880); *Meditations on the Collects* (1887); *The Example of the Passion* (1882); *The Virgin Mother; Christ's Temptation and Ours; A Charge on Marriage and Divorce; Confirmation;* and *Marriage with Relatives* (1901).

HALL, Asaph (1829—). An American astronomer, born of Revolutionary stock in Goshen, Conn. At sixteen he became a carpenter, but spent his spare time in study. In 1854 he went to Central College, McGrawville, N. Y., and in spite of poor teaching, learned some mathematics in the year and a half he spent there. He studied under Brünnow at Ann Arbor, where he made his first acquaintance with astronomy, and in 1857 went to Cambridge as assistant to Professor Bond at the pitiful salary of three dollars a week. He studied mathematics and German by himself, and gradually advanced until he earned $600 a year at the Cambridge Observatory. In 1862 he took a civil-service examination and became an aid, and a year afterwards professor of mathematics in the United States Naval Observatory. This position he held until 1891 and was sent on several expeditions: in 1869 to Bering Strait, in 1870 to Sicily to observe eclipses; in 1874 to Vladivostok to observe the transit of Venus; to Texas in 1882 for the same purpose; and to Colorado in 1878 on a solar-eclipse expedition. His greatest fame came from his discovery in 1877 of the two satellites of Mars, which he called Deimos and Phobos. In recognition of this discovery he received a gold medal from the Royal Astronomical Society, and the award of the Lalande prize from the Paris Academy. In 1875 he was elected a member of the National Academy of Sciences, and afterwards was elected its president. He retired from the Government employ in 1891, and four years later went to Harvard as professor of astronomy, where he remained until 1901. In 1902 he was president of the American Association for the Advancement of Science.

HALL, Basil (1788-1844). A British naval officer, author, and traveler, born and educated in Edinburgh. He entered the navy in 1802, saw service on the coasts of China, India, and South America, was made post-captain in 1817, and left the navy in 1823. The rest of his life was spent in travel, and scientific pursuits at home. The descriptions of his various voyages while in the navy, and of his subsequent travels, show a broad and keen observation and were well received, though his *Travels in North America* caused great indignation and met with much hostile criticism in the United States, because of his outspoken remarks upon American customs. His scientific work was mostly confined to personal experimentation, and was of little permanent value, though he was a member of many scientific societies and contributed widely to their journals. In 1842 his mental powers failed, and he died in confinement two years later. His most important writings are: *A Voyage to the West Coast of Corea and the Great Loo-Choo Island* (1818); *Extracts from a Journal Written on the Coasts of Chili, Peru, and Mexico* (1824); *Travels in North America* (1829); *Fragments of Voyages and Travels* (1831); *Schloss Hainfeld, or a Winter in Lower Styria* (1836); *Spain and the Seat of War in Spain* (1837); and *Patchwork* (1841).

HALL, Charles Cuthbert (1852—). An American clergyman of the Presbyterian Church, born in New York City. He was educated at Williams College, the Union Theological Seminary, the Presbyterian College in London, and the Edinburgh Free Church College; was ordained in 1875, and succeeded Wendell Prime as pastor of the Union Presbyterian Church of Newburg, N. Y. Two years afterwards he became pastor of the First Presbyterian Church of Brooklyn, N. Y. *Qualifications for Ministerial Power* (1894) was Dr. Hall's Carew lectures at Hartford Theological Seminary. A trustee of Atlanta University and of Williams College, and long a director of Union Theological Seminary, he was chosen president of the last-named institution in 1897. Dr. Hall compiled with Lasar *The Evangelical Hymnal*.

HALL, Charles Francis (1821-71). An American Arctic explorer. He was born at Rochester, N. H., and was for a time a blacksmith, and later became a stationer and journalist. In 1860 he sailed from New London in the *George Henry*, to discover the remains of the Franklin party, the expense of the expedition being borne largely by Henry Grinnell (q.v.). His ship was blocked by ice, and for two years he lived among the Eskimos near Frobisher Bay, returning in 1862. In 1864 he published an account of the expedition in *Arctic Researches* and in *Life Among the Esquimaux*. In the same year Hall returned to the Arctic to renew his search for evidences of the fate of the Franklin expedition. It was not till the spring of 1866 that he met Eskimos at Cape Weyton, south of Boothia Felix, who had seen Franklin and visited the deserted ships. He obtained from them silver bearing the crest of Franklin and other officers of the party. While searching for further evidence he did some interesting geographical work by filling in the gap between Rae's farthest (1846) and Parry's farthest, in Fury Strait (1825), thus completing the mapping of the north coast of the continent. At last, after five years of toil, he met natives near the south shore of King William Land, in the summer of 1869, who gave him personal or traditional information of the fate of 79 of the 105 men who died of starvation in King William Land. It is now believed that the remaining 26 reached the coast of the mainland and perished. It was thus McClintock, Hall, and Schwatka and Gilder who solved the fate of the Franklin party.

His last expedition was undertaken in 1871, at the expense of the United States Government, in the small naval vessel *Polaris*, which proved to be unfitted for Arctic work. He ascended the Smith Sound channels into the Polar Sea to 82° 11′ N., the most northern point attained up to that time by a vessel. Unable to proceed farther, the expedition spent the winter of 1871-72 at Thank God Harbor, on the Greenland coast. In the fall Hall made a sledge journey north to Cape Brevoort, and was the first to see the land on the west side of Robeson Channel and to determine approximately its extension to the north. Upon returning from this journey he was taken violently ill, and died on November 8, 1871. In the fall of 1872 the *Polaris* pushed into an impassable ice pack and drifted south for two months, when a terrible gale broke up the pack and nearly destroyed the vessel. A part of the supplies had been removed to the ice, on which 19 of the crew had taken refuge, and they were carried away from the vessel in the darkness. After experiencing all the horrors of a five months' winter drift on an ice-floe, they were picked up, off Labrador, 1300 miles from the point of separation, with 20 in the party, the Eskimo Hannah having given birth to a girl.

The ship had drifted to the Greenland shore a little south of Smith Sound, whence, in the spring of 1873, the remainder of the party retreated south in boats, and were rescued at Cape York on June 22d by a Scottish whaler. Though the expedition was unfortunate, its geographical results were very important. Hall completed the exploration of Kennedy Channel, discovered Hall Basin and Robeson Channel, extended both Greenland and Grinnell Land northward nearly two degrees of latitude, and visited the unknown Polar Sea. He was not competent to take charge of scientific work, but he was a genuine Arctic pioneer, full of resources, and undaunted by obstacles, many of which he overcame by patient and untiring effort. The scientific results of the *Polaris* expedition were important, and were published by the Government in 1879. Consult also: Davis's *Polaris North Pole Expedition* (Washington, 1876); Tyson's *Drift* (New York, 1874); Bessel's *Die amerikanische Nordpola Expedition* (Leipzig, 1879).

HALL, Chester Moor (1703-71). An English scientist, inventor of the achromatic telescope. He was born at Leigh, in Essex; was a student of the Inner Temple in 1724 and a bencher in 1763. He lived at New Hall, Sutton, and was often called 'Moor of Moor Hall.' From study of the structure of the human eye he arrived at the conclusion that achromatic lenses were possible; discovered two kinds of glass in 1729, of enough variation of dispersion; and in 1733 had made several telescopes. But though there seems no doubt of the priority of his invention, he took no pains to appear in the suit of Dollond *vs.* Champness (1766). See Achromatism.

HALL, Christopher Newman (1816-1902). An English Congregational minister, born at Maidstone, Kent, and educated at Totteridge, at Highbury College, and at the University of London. For twelve years he was pastor of the Albion Congregational Church at Hull. In 1854 he succeeded Rowland Hill and James Sherman at Surrey Chapel, and in 1876 he went to Christ Church, Lambeth, a charge which he resigned in 1892. He became widely known in England as a total-abstinence agitator and as an evangelist. He was a friend of the North during the Civil War, and in 1867 toured America with the intention of quieting differences between Great Britain and the United States. Dr. Hall's tracts were his best-known works, especially: *Come to Jesus* (1846); *It is I* (1848); *Follow Jesus;* and many others, of which hundreds of thousands have been distributed. He wrote besides: *The Land of the Forum and the Vatican* (2d ed. 1859); a biography of his father, under the title *Conflict and Victory* (2d ed. 1874); *Lyrics of a Long Life;* and an *Autobiography* (1865).

HALL, Edward (c.1499-1547). An English historian, son of John and Catharine Hall, who seem to have been prominent in the Reformation, and may have been the "John Hall and his wife," prisoners in Newgate, "for the testimony of the Gospel" (1555), mentioned by John Fox. Edward Hall was educated at Eton and at King's College, Cambridge, and studied law. He was a strong defender of the Tudors, and carried his ideas of reform no further than the King, but supported the royal supremacy in Parliament, spoke in behalf of the Bill of Six Articles (1539), and was appointed (1541) a member of the commission to deal with all transgressors of that law. His *Union of the Noble and Illustre Famelies of Lancastre and York* (1542; and, the most complete edition, from the press of Richard Grafton, and with a preface by him, 1550) is especially valuable for the reign of Henry VII. and the early years of Henry VIII. It was largely used by Shakespeare in his historical plays, and was borrowed from by Grafton, Holinshed, and Stow.

HALL, Fitzedward (1825-1901). An American philologist, who was born at Troy, N. Y., but spent his mature years in England. He was educated at Walpole, N. H., Poughkeepsie, the Rensselaer Polytechnic Institute, and at Harvard, where he did not finish his course, as he was sent to India to look for a runaway brother. At Benares, in 1850, he was appointed to a post in the Government College, which became in 1853 an Anglo-Sanskrit professorship. In 1855 he was appointed inspector of public instruction for Ajmere and Mairwara, and a year later for the Central Provinces. In 1860 he received the degree of D.C.L. at Oxford, and two years later left India for London, where he became professor of Sanskrit, Hindustani, and Indian jurisprudence at King's College, received the post of librarian at the India Office, and in 1864 was made examiner in Hindustani and Hindi on the Civil-Service Commission. In 1880 he succeeded Max Müller as examiner in Sanskrit, and from 1887 to his death was examiner in English also. His edition of the *Vishnupurâna* is marked by wide reading and by many quotations from unpublished manuscripts in his own possession. About 1870 he turned his attention to English philology, and published: *Recent Exemplifications of False Philology*, an attack on Richard Grant White (1872); *Modern English* (1873); *On English Adjectives in -able, with Special Reference to 'Reliable'* (1877); *Doctor Indoctus* (1880); and other volumes. The most lasting monument to his activity in English philology is his work on the *Oxford Dictionary*, and on Wright's *English Dialect Dictionary*. A valuable library of a thousand Oriental manuscripts and many books he gave to Harvard University. From 1869 until his death he lived at Marlesford, in Suffolk. His principal works in Sanskrit are: *Atmabodha* (1852); *Sânkhyaprâvachana* (1856); *Sâryasiddhânta* (1859); *Vâsavadattâ* (1859); *Sânkhyasâra* (1862); and *Dasarûpa* (1865); and in Hindi, a *Reader* (1870), and Ballantyne's *Hindî Grammar* (1868).

HALL, George Henry (1825—). An American painter, born in Boston. He studied at Düsseldorf and in Paris, and traveled in Spain, Italy, and Egypt. In 1868 he was elected an Academician. His works include: "Group of Spanish Children;" "Young Lady of Seville;" "The Seasons;" "Studies of Grapes;" "Bric-a-Brac of Damascus;" "April Showers;" and some portraits.

HALL, Gertrude (1863—). An American author, born in Boston. She was educated in Florence, and published several volumes of verse, beginning with *Verses* in 1890, and including *Allegretto* (1894), *The Age of Fairy Gold* (1899), *April's Sowing* (1900), and a translation into English of Rostand's *Cyrano de Bergerac.*

HALL, Granville Stanley (1845—). An American educator. He was born at Ashfield, Mass.; graduated at Williams College in 1867, and subsequently spent several years studying philosophy and psychology in Germany. He was professor of psychology at Antioch College, Ohio, from 1872 to 1876, and at various periods was lecturer on the same subject at Harvard and at Williams. In 1884 he was chosen professor of psychology at Johns Hopkins University, and in 1888 he became president of Clark University, Worcester, Mass. He became an important contributor to educational literature, and is a leading authority in that field. He was also appointed editor of the *American Journal of Psychology* and the *Pedagogical Seminary*. Among his books are: *Aspects of German Culture* (1881); *Hints Toward a Select and Descriptive Bibliography of Education* (1886), with John M. Mansfield; and *The Contents of Children's Minds on Entering School* (1894).

HALL, Isaac Hollister (1837-96). An American Orientalist, born at Norwalk, Conn., and educated at Hamilton College. After eleven years at the New York bar he was appointed professor at the Protestant College of Beirut, where in 1876 he discovered a Syriac manuscript of the Philoxenian version of the Gospels, Acts, and, in part, the Epistles. This he published in 1884. He returned to America in 1877; distinguished himself by his studies of epigraphy, especially as the first to decipher the Cypriote inscriptions; in 1885 was appointed curator of the Metropolitan Museum of New York City, and later lectured on New Testament Greek at Johns Hopkins University. In 1884 he deciphered "Antilegomena Epistles" from the Syriac manuscript discovered by the Rev. W. F. Williams, which he published (1886) in facsimile. He also compiled a *Critical Bibliography of the Greek New Testament as Published in America* (1884).

HALL, Sir James (1761-1832). A British geologist and chemist, noted for his application of chemical tests to geological hypotheses. He was born in Haddingtonshire, Scotland, the eldest son of Sir John Hall, Baronet, and succeeded to the baronetcy in 1776. Having become interested in geology during the early part of his career, he associated intimately with James Hutton, then the most eminent name in that science, and was ultimately led to accept his uniformitarian theory of geology, which explains the phenomena of the earth's crust by steady and progressive natural changes. In testing the theory he traveled extensively, and studied the rocks in different parts of Scotland, as well as in the Alps, in Italy, and in Sicily. He also had recourse, for the same purpose, to experiments in his laboratory, but, owing to Hutton's disapproval of that method, did not publish the results until after the latter's death in 1797. These made good his contention in some respects against the opponents of Hutton's system. On some points, however, he differed from his master, explaining, for example, the boulders on the Jura and similar phenomena at Corstorphine by the supposed action of a sea flood instead of by the glacial theory which is now generally accepted. He was also deeply interested in the study of architecture, and in 1813 published an *Essay on the Origin, History, and Principles of Gothic Architecture*, whose ideas had already been presented in less elaborate form before the Royal Society of Edinburgh in 1797. He aims to prove that Gothic architecture is an evolution begun by reproducing in stone crude wattle buildings, and he constructed a miniature wattle-work cathedral in Gothic style to illustrate his argument. Hall took part in Parliamentary life, representing the borough of Michael in Cornwall from 1807 to 1812. After his death, which occurred at Edinburgh in 1832, an account of a machine which he invented for the regulation of high temperatures was given before the Geological Society of London.

HALL, James (1793-1868). An American journalist and author, born in Philadelphia. He studied law, but joined the army in 1812, and served at Lundy's Lane and Fort Erie. Meanwhile he continued his legal studies, and in 1820 he removed to Shawneetown, Ill., where he began practice at the bar, and edited the *Illinois Gazette*. Later he was judge of the Circuit Court and then State treasurer, meanwhile editing at Vandalia, Ill., the *Illinois Intelligencer*. At Cincinnati he conducted the *Western Monthly Magazine* (1833-37), and was engaged in banking. Among his publications are: *Letters from the West* (1829); *Legends of the West* (1832); *Tales of the Border* (1835); *Life of W. H. Harrison* (1836); *History of the Indian Tribes* (3 vols., 1838-44); and *The Romance of Western History* (1847). His collected works were published in four volumes in 1853-56.

HALL, James (1811-98). An American geologist and paleontologist, born in Hingham, Mass. He studied under Amos Eaton at the Rensselaer Polytechnic Institute, where he subsequently occupied the chair of geology. In 1836 he was appointed to the Geological Survey of New York, and was soon placed in charge of the work in the western part of the State. The report of the survey which appeared in 1843 laid the foundation for the proper classification of the Paleozoic formations in America, and was the means of establishing the office of State Geologist, with Hall as its occupant. He now devoted himself to a comprehensive study of the older fossil-bearing rocks, and published his researches from time to time in various reports and monographs, which have come to be regarded as classics by students in this branch of geology. He was president of the American Association for the Advancement of Science in 1856, of the Geological Society of America in 1889, and was elected honorary president of the International Congress of Geologists at Washington in 1891. He received many honors from foreign scientific societies, including the Wollaston medal of the London Geological Society. Among his more important contributions to geology are the following: *Geology of New York*, part iv. (1843); *Palæontology of New York* (8 vols., 1847 et seq.); *Graptolites of the Quebec Group* (1865); and portions of the *Report of the Geological Survey of Iowa* (1858-59), and of the *Report on the Geological Survey of the State of Wisconsin* (1862).

HALL, John (1829-98). An American clergyman, born of Scotch parentage at Market Hill, County Armagh, Ireland, and educated at Belfast College. He was licensed to preach by the Belfast Presbytery in 1849, was a missionary in West Ireland for three years, held a pastorate for an equal period at the First Presbyterian

Church in Armagh, and in 1858 accepted a call to Saint Mary's Abbey, Dublin, where he remained for nine years, actively occupied in Church work and in matters relating to popular education. In 1867 he came to America as a delegate from the General Assembly of the Presbyterian Church in Ireland, and shortly after his return was called to the pastorate of the Fifth Avenue Presbyterian Church in New York City, where he remained until his death. He was a member of the International Sunday-School Committee from 1872 to 1896, served as a trustee of Princeton University and a director of the Union Theological Seminary; delivered many lectures at Yale on the Lyman Beecher foundation; and from 1882 to 1891 was chancellor of the University of the City of New York (now New York University). Among his best-known writings are: *Family Prayers for Four Weeks* (1868); *Care Cast upon the Lord* (1869); *Papers for Home Reading* (1871); *Questions of the Day* (1873); *Preaching: Manner and Matter* (1874); *God's Word Through Preaching* (1875); *You and Your Children* (1877); *Foundation Stones for Young Builders* (1881); *A Christian Home and How to Maintain It* (1883); *Light unto My Path* (1895). Consult T. C. Hall, *John Hall, Pastor and Preacher* (New York, 1902).

HALL, John Vine (1774-1860). An English religious writer and advocate of total abstinence. He was born at Diss, Norfolk. When a young man he fell into drunken habits, but after a hard struggle reformed, and became a teetotaler. From 1814 to 1850 he was a bookseller at Maidstone. From 1854 till his death (1860) he devoted himself to religious and temperance work. His *Sinner's Friend* (1821) is said to have been translated into thirty languages and circulated in millions of copies. Consult his autobiography, *Conflict and Victory*, edited by his son, the Rev. Newman Hall (London, 1874).

HALL, Joseph (1574-1656). An English bishop, remarkable for his learning, piety, and misfortunes. He was born July 1, 1574, at Ashby-de-la-Zouch, Leicestershire. He was educated at Emanuel College, Cambridge, of which he became a fellow (1595). Entering the Church, he became, in 1617, Dean of Worcester; was one of the English deputies to the Synod of Dort (1618-19); was consecrated Bishop of Exeter in 1627; and in 1641 was translated to Norwich. In the latter years of his life he was accused of Puritanism, and incurred the displeasure of Archbishop Laud. In 1641, having joined the prelates who protested against the validity of all laws passed during their forced absence from Parliament, he was committed to the Tower and threatened with prosecution for high treason; but was set at liberty at the end of seven months, on finding bail for £5000. On his return to Norwich he found his revenues sequestrated and his property pillaged. He rented a small farm at Higham, near Norwich, to which he retired (1647), and died September 8, 1656. His works, mostly of a controversial character, have been published, with autobiography, notes, etc., by Pratt (London, 1808); Peter Hall, a descendant of Joseph (Oxford, 1837-39); and Philip Wynter (Oxford, 1863). Of his other works, the most read now are his devotional treatises (*Select Devotional Works*, 1830), in seven parts, of which a number have been separately reprinted. His poetical *Satires*, written at college, were praised by Pope. For his life, consult John Jones (London, 1826).

HALL, Lyman (1725-90). A signer of the Declaration of Independence. He was born in Connecticut, and remained there until his graduation from Yale College in 1747, after which he removed to the parish of Saint John, in Georgia. This parish was largely peopled by New Englanders, and to them is chiefly due Georgia's final decision to throw in her lot with the other colonies. The people of this parish, disgusted with the indecision of their fellow colonists, endeavored to ally themselves with the Committee of Correspondence in Charleston, S. C., and when this proved infeasible decided to refrain from trading with the other colonists of Georgia, and particularly with the people of Savannah. In 1775 they sent Hall as their delegate to Congress, where he was allowed to debate, but being the only representative of Georgia, could not vote when the voting was done by whole colonies. Soon afterwards Georgia joined her sister colonies and elected five delegates to the Congress, among them Hall. He was reëlected in 1776, and again in 1780.

HALL, Marshall (1790-1857). An eminent English physiologist and physician, born at Basford, Notts. At the age of twenty (having been previously apprenticed to a chemist) he entered on the study of medicine at the University of Edinburgh, where, in 1812, he took his degree of M.D. After three years' subsequent attendance at the leading schools of medicine on the Continent, he commenced practice in Nottingham in 1815, and rapidly obtained a high provincial reputation. In 1826 he removed to London, where his career as a physician was eminently successful. His name is well known in connection with the doctrine of the reflex function of the nervous system. He admitted that the phenomena of which he treated had been long known to physiologists; but he believed himself to have been the first to show their independence of sensation, to bring them together under one generalization, to establish with precision the laws of their production, to assign them their just rank in physiology, and to apply the doctrine to the elucidation of disease. His last bequest to the science of medicine and the cause of humanity was the description of a simple and easily applied method of restoring suspended respiration, which has been the means of saving many from untimely death, and is known as 'the Marshall Hall method.' It is briefly as follows: The insensible person is laid on his back. His mouth is opened, and the tongue, grasped with a towel or handkerchief, is pulled forward. The lower part of the body is then elevated for a moment, to let water in the larynx and mouth run out by gravitation. The body is then laid on its back, with the left arm bent backward and upward, and placed under the head. The body is then gently rolled over on the face, the tongue being held forward, and then rolled back again. The object kept in view is to compress the thorax and empty the lungs by means of the weight of the body. The manœuvre must be repeated once every four seconds, deliberately, and preferably by the watch; for rescuers are apt to be too hasty and to perform the manipulation incompletely through nervousness. This method of resuscita-

tion has been largely superseded by the 'Sylvester method,' described under RESPIRATION, ARTIFICIAL.

HALL, OWEN (real name JAMES DAVIS). An English dramatic author. He was educated at University College, London, and practiced as a solicitor in London from 1874 to 1886. In the latter year he deserted the law for journalism, was editor of the *Bat* in 1885-87, and of *Galignani's Messenger* in 1888-90. In 1899 he founded and became editor of a weekly magazine known as the *Phœnix*. He is best known by his librettos, such as: *A Gaiety Girl; An Artist's Model; The Geisha; A Greek Slave; Florodora;* and *The Silver Slipper.*

HALL, ROBERT (1764-1831). A celebrated English Baptist preacher and writer. He was born at Arnesby, near Leicester, May 2, 1764, the son of a Baptist minister and the youngest of fourteen children. He was feeble in body and precocious in intellect. At the age of fifteen he was sent to a Baptist academy at Bristol. In 1781 he entered King's College, Aberdeen. Graduating M.A. in 1784, he became (1785) assistant Baptist minister and tutor in the academy at Bristol. He was a fluent, rapid, and impressive speaker, and was liberal, but not heterodox, in his religious views. In consequence of a disagreement with his colleague, he went, in 1790, to Cambridge, where, by his elaborate composition and vivid eloquence, he rose to the highest rank of British orators. He was not less distinguished for his writings and published discourses. His *Apology for the Freedom of the Press* (1793), and sermon on *Modern Infidelity* (1800), extended his reputation. In 1806 he resigned because of poor health, and in 1807 he settled in Leicester. He married in 1808, after a whimsical courtship; returned to Bristol in 1826, and died there February 21, 1831. He was an indefatigable student, learning Italian at sixty that he might enjoy Dante. Nearly all his life he suffered from ill health, and had at times attacks of insanity; yet few men have performed more intellectual labor. A complete edition of his works, with a memoir by Dr. O. Gregory, and observations on his character as a preacher by John Foster, was published in London, in six volumes (1831-33; 11th ed. 1853). His miscellaneous works are in Bohn's *Standard Library*, and an edition of his *Work of the Holy Spirit* appeared in London (1886). Consult his life, by Hood (London, 1881).

HALL, SAMUEL CARTER (1800-89). A British author and editor, born near Waterford, Ireland. He went to London in 1821, became a reporter of debates in the House of Lords in 1823, commenced a year later the study of law, though he never practiced, and had a varied experience as editor of magazines and books. In 1824 he married Anna Maria Fielding, who became well known as a skillful delineator of Irish life and customs. He edited the London *Art Journal* from 1839 to 1880; introduced during his period of supervision the engraving of sculpture and other innovations; and exposed the prevalent frauds in the sale of pictures alleged to be by the old masters. In 1880 he was granted a pension by Lord Beaconsfield. He frequently collaborated with his wife, rendered her valuable assistance in the preparation of her very popular *Ireland*, and edited, with extensive critical and explanatory annotations: *The Book of Gems* (1836-38); *The Book of British Ballads* (1842); *Gems of European Art, the Best Pictures of the Best Schools* (1843-45); *The Beauties of the Poet Moore* (1844); *The Baronial Halls and Picturesque Edifices of England* (1848); *The Gallery of Modern Sculpture* (1849-54); and *Selected Pictures from the Galleries and Private Collections of Great Britain* (1862-68). The best known among his original works are: *The Trial of Sir Jasper: A Temperance Tale in Verse* (1873); *An Old Story: A Temperance Tale in Verse* (1875); *A Memoir of Thomas Moore* (1879); *Rhymes in Council; Aphorisms Versified* (1881); and *Retrospect of a Long Life, from 1815 to 1883* (1883).

HALL, WILLIAM EDWARD (1835-94). An English writer on international law, born at Leatherhead. He was educated at University College, Oxford, where he took the degree of A.B. in 1856 and A.M. in 1859, and in the latter year won the chancellor's prize for a notable essay on *The Effect Produced by the Precious Metals of America upon the Greatness and Prosperity of Spain.* He studied at Lincoln's Inn, and was called to the bar in 1861, but turned his energies toward a study of modern history and international law. He traveled widely, and became well known as an art collector, upon which subject he also wrote extensively. In 1867 he attracted public attention by the publication of an able treatise entitled *A Plan for the Reorganization of the Army.* In 1874 appeared his first work on international law, *The Rights and Duties of Neutrals.* This was followed in 1880 by his great work, *International Law,* the publication of which marked an epoch in the literature of the subject, and secured for its author at once recognition as one of the greatest living authorities in that branch of law. The book reached a fourth edition in 1895, and was accepted as a standard work in Europe and America as well as in England. He also wrote *A Treatise on the Foreign Powers and Jurisdiction of the British Crown* (1894). He was elected in 1882 a member of the Institut de Droit International, and in 1891 was appointed one of the English commissioners for the settlement of the Newfoundland fisheries question with France.

HALLAM, ARTHUR HENRY (1811-33). An English essayist, son of Henry Hallam. He was a young man of great promise, and was educated at Eton, and at Trinity College, Cambridge. On graduating in 1832, he began the study of law; but the next year went abroad with his father, and died suddenly at Vienna. At Cambridge he formed a close friendship with Alfred Tennyson, to whose sister he was engaged to be married. Hallam's name has been rendered memorable through its connection with Tennyson's "In Memoriam," in which the poet employs the premature death of his friend as the starting-point of the well-known elaboration of his views on life and death. Hallam's *Remains in Prose and Verse* were published in 1834.

HALLAM, HENRY (1777-1859). An English philosophical historian and critic. He was the only son of John Hallam, Dean of Bristol and Canon of Windsor, and was born in Windsor on July 9, 1777. He was educated at Eton, and at Christ Church, Oxford, where he graduated B.A. in 1799; studied law at the Inner Temple, of which society he became a bencher; and was in practice on the Oxford circuit until 1812, when

an inheritance, through his father's death, together with a Government sinecure, allowed him to follow his natural bent for historical study and literary work. His literary aptitude had been early exhibited by precocious productions in the *Musæ Etonenses* (1795), and his contributions to the *Edinburgh Review* and other periodicals soon brought him into prominence among the most noted writers of the day. His first extended work, *A View of the State of Europe During the Middle Ages* (1818), was the result of ten years' preparation, occasionally relieved by intervals of Continental travel. His other important works are: *The Constitutional History of England from the Accession of Henry VII. to the Death of George II.* (1827), and *Introduction of the Literature of Europe in the Fifteenth, Sixteenth, and Seventeenth Centuries* (4 vols., 1837-39). Marked by conscientious and extensive research in original sources, by impartial analysis and criticism, together with ease and lucidity of style, these works long remained standard authorities, unsurpassed in their accuracy of details by the more extended modern works which have replaced them in the estimation of scholars. They went through several editions, and were translated into the leading European languages. In politics Hallam was a Whig; his candor and general temperament, however, unsuited him for the conflicts of parties, and he took no active part in them, but he displayed a genuine interest in all questions of social improvement. He acted with the Wilberforce party for the abolition of slavery, as well as in other humane schemes, and was one of the original promoters of the Society for the Diffusion of Useful Knowledge. In 1830 he was one of the recipients of the two fifty-guinea gold medals instituted by George III. for historical preeminence. Washington Irving received the other medal. Other honors included a D.C.L. degree, fellowship of the Royal, Antiquarian, and other learned societies, and trusteeship of the British Museum. Hallam's life was saddened by much domestic affliction, ten out of his eleven children, and his wife, having died before him.

HALLAM, Robert, Bishop of Salisbury (c.1360-1417). An English ecclesiastic. Educated at Oxford, he was a prebendary of Salisbury Cathedral by 1394, and six years afterwards was Archdeacon of Canterbury. After having been chancellor of Oxford University (1403-05), he was made Bishop of Salisbury in 1407 and a cardinal in 1411. He was a noted reformer, a leader of the party which tried to assert the supremacy of the Papal Council over the Pope himself, and he maintained so high a standard of independence throughout his investigation of abuses, while preserving the unity of his Church, that his death was considered responsible for the reactionary movement of Roman Catholicism in England.

HALLBERG-BROICH, häl'bĕrg-broik, Theodor Marie Hubert, Reichsfreiherr von (1768-1862). A German soldier and author, known also by the pseudonym Eremit von Gauting, born in the Duchy of Jülich. He entered the military service of the Electorate of Bavaria, and subsequently, after extensive travels, became so active a patriot in the German cause that he was imprisoned by the French invaders for eight months in Paris. In 1813 he organized the militia forces enrolled between the Rhine and the Maas, and on January 6, 1814, crossed the Rhine at Coblenz in command of 30,000 troops. His writings, marked by original viewpoints and a somewhat bizarre style, include: *Reise durch Skandinavien* (1818); *Reise durch Italien* (1830); *Reise durch England* (1841); and *Deutschland, Russland, Kaukasus, Persien* (2 vols., 1844). Consult Giftel, *Leben des preussischen Generals Freiherrn von Hallberg-Broich* (Berlin, 1863).

HALLE, or **HALLE AN DER SAALE,** häl'le än dĕr zä'le (Lat. *Hala Saxonum*). An important city in the Prussian Province of Saxony, situated on the right bank of the Saale, and on a number of islets, in latitude 51° 29′ N., and longitude 11° 58′ E., 21 miles by rail northwest of Leipzig (Map: Prussia, D 3). Halle has broad promenades on the site of its ancient fortifications, and abounds in mediæval buildings and monuments. Among the prominent churches are the splendid edifice of Saint Maurice, founded in the twelfth century and containing a fine choir and altar, and a pulpit with reliefs; the sixteenth-century Marktkirche, with its four towers; and the cathedral, consecrated in 1523. The chief secular edifices and monuments are the Rathaus, dating from the fifteenth century and recently renovated; the Rote Turm, a clock tower 276 feet high, dating from the fifteenth century; the neighboring statue of Roland, erected at a more recent date; a statue of Handel, who was born here; the new Ratskeller, built in 1893, in the Gothic style, and used partly for municipal offices; the remains of the Moritzburg, the former residence of the archbishops of Magdeburg; the Archbishop's residence, adjoining the cathedral and containing some valuable collections of the provincial museum; and, lastly, the buildings of the famous university. (See Halle, University of.) The interesting cemetery is like an Italian campo santo, and has handsome arcades. Besides the university the educational institutions include two gymnasia, the Francke Institutions (comprising a Latin high school, a 'real' school, a seminary for teachers, etc.); also the provincial museum with prehistoric antiquities, the municipal museum devoted to art, and the municipal theatre. Halle has a zoölogical garden and important hospitals, and is the seat of numerous historical, scientific, and economic societies.

It is a very important industrial town. At the head of the local industries for centuries has been the production of salt, which is obtained on an islet of the Saale, the yearly output amounting now to nearly 9000 tons. The workmen who are engaged in the salt-works are known as Halloren, and differ from the rest of the population of Halle in the matter of dialect and certain customs. In olden times they formed a separate caste. The metal industries developed greatly during the second half of the nineteenth century, and Halle has now over fifty large establishments for the manufacture of machinery, besides numerous establishments for the production of other iron and copper articles. There are also many starch factories. Additional manufactures are of chemicals, chocolate, cocoa, chicory, malt, sugar, beer, spirits, etc. Sugar-beets are raised in the vicinity, and there are brown-coal mines. The commerce, mostly in grain, sugar,

and colonial goods, is quite extensive, a considerable part of the traffic being by river. The town has good railroad connections. There is an electric street railway.

Halle is administered by a chief burgomaster, a burgomaster, an executive board of 16, and a municipal council of 54 members. The city owns the water-works, two gas plants, an electric plant since 1900, and an abattoir. The budget of 1902 balanced at $1,625,600, the most significantly large item of expenditure being for education. The municipal debt amounted to $6,116,124. Halle began to grow only in the second half of the nineteenth century. From 52,620 in 1871 the population, almost wholly Protestant, increased to 71,484 in 1880, 101,401 in 1890, and 156,611 in 1900, the extraordinary increase during the last decade being due to the annexation of suburbs.

Halle, first mentioned about 800 as the Castle of Halla, and as a town in 1064, is of very ancient origin. It was presented by Otho I. to the Archbishopric of Magdeburg, and began to grow in importance with the foundation of the monastery of Neuwerk in 1116. As a member of the Hanseatic League it attained considerable commercial prominence, and succeeded in freeing itself from the rule of the Archbishops of Magdeburg. Its independence, however, was of short duration, owing to the internal conflicts between the common people and the patricians, which gave Archbishop Ernest an opportunity to regain the town in 1478. The Reformation became an issue in Halle in 1522, and in 1541 a Lutheran superintendent was appointed. By the Treaty of Westphalia the town came into the possession of Brandenburg. Taken by the French in 1806, it was annexed to Westphalia in the following year, and passed to Prussia in 1813. Consult: Hertzberg, *Geschichte der Stadt Halle*, vols. i.-iii. (Halle, 1889-92); Schrader, *Geschichte der Universität Halle* (Berlin, 1895).

HALLE, University of. A German university which came into existence through the rivalry between conservative Saxony and progressive Brandenburg, and because the Hohenzollerns desired to have a more centrally located Lutheran university than that at Königsberg. The new foundation was united with a Ritter academy already existing, and was formally opened in 1694, with over 700 students. Thomasius and A. H. Francke were the most influential in determining the progressive character of the institution, which has been called the first modern university. In the earlier half of the eighteenth century it was preëminently the chief resort for Protestant Germany, having 1500 students on the average; later on, Göttingen became a strong rival. From the beginning, Halle was one of the leading theological schools of Germany, a distinction it has never lost, though it changed from its original pietism to a bold rationalism in the latter half of the eighteenth century. In the period of the Napoleonic Wars the university was twice suspended for its strong Prussian utterances. In 1817 the old and honorable University of Wittenberg (founded 1502) was united with it. The main university building was erected in 1832-34; nearly all the others in the seventies and eighties. Much attention is given to instruction in agriculture. Halle had in 1901 about 2000 students. The library, founded in 1696, contains over 210,000 volumes and 800 manuscripts, besides the Ponickau collection of books on Saxony and Thuringia with 15,000 volumes and 1000 manuscripts. Among the great names of Halle are those of Chr. Wolf, F. A. Wolf, Schleiermacher, Gesenius, Tholuck, Leo, and Bergk. Halle was also the seat of the scientific society Academia Naturæ Curiosorum, founded by J. B. Bausch in 1652, and now known as the Leopoldinisch-Karolinische Akademie. See Academy, *passim*.

HALLE, äl, Adam de la. See Adam de la Halle.

HALLÉ, häl'lē, Sir Charles (or Karl Halle) (1819-95). A German-English pianist and conductor. He was born at Hagen in Westphalia, his father being the town kapellmeister, and was regarded when but a young child as a musical prodigy. After serious study with Rink at Darmstadt, he went to Paris (1836), where he laid the foundation of all his subsequent success. He earned for himself a solid reputation during the twelve years of his stay there, and was in friendly contact with Cherubini, Chopin, Liszt, and Kalkbrenner. The political disturbances of 1848 caused his removal to London, where he was enthusiastically received. It was in Manchester, however, that he gained his most enduring fame, and did his best and most important work. He had been appointed director in 1853 of the Gentlemen's Concerts, and in 1857 commenced a series of subscription concerts with his famous orchestra, which up to the time of his death was the greatest musical educational factor in the north of England. Although his greatest interests were in Manchester, he was closely connected with the musical life of London, in 1861 performing all Beethoven's sonatas in eight matinée concerts. In 1880 he also produced Berlioz's *Faust* in the same city. In 1888 he was made a knight by the Queen (Victoria), and the same year married Madame Norman Neruda, with whom in 1890 and 1891 he made a tour of Australia. His compositions were entirely instrumental, and included many orchestral arrangements, and a method for the pianoforte. He died in Manchester.

HALLÉ, Wilma Maria Francisca, Lady. See Neruda, Wilma Maria Francisca.

HAL'LECK, Fitz-Greene (1790-1867). An American poet, born at Guilford, Conn. He was educated in Guilford, and in 1811 became a clerk in a New York bank, where he remained for twenty years. He was afterwards the confidential agent of John Jacob Astor in his commercial affairs, and was appointed by him one of the original trustees of the Astor Library in New York. In 1849 he retired to his native place, where he spent the remainder of his life. Halleck wrote verses from his boyhood, but in his collected poems he included nothing juvenile. In 1819 he became associated with Joseph Rodman Drake (q.v.) in contributing the humorous series of "The Croaker Papers" to the *Evening Post*. The illness of Drake soon put an end to these papers, and Halleck commemorated his friend's death in the most beautiful and best-known of his poems, beginning "Green be the turf above thee" (1820). His longest poem, *Fanny* (1819), is a satire on the literature, fashions, and politics of the time. It obtained a factitious popularity, but hardly repays reading. In 1822-23 Halleck visited Europe, and in 1827 published an edition of his poems, among them the popular and good

verses on "Alnwick Castle," and on "Burns." These, with "Marco Bozzaris" (1825), constitute his chief claim to remembrance as a poet of a slight though genuine lyric vein, and of distinct capacity for society verse, who was yet artist enough to confine his production to a very moderate compass. Consult: Wilson, *The Life and Letters of Fitz-Greene Halleck* (New York, 1869); *The Poetical Writings of Fitz-Greene Halleck*, edited by Wilson (ib., 1869).

HALLECK, Henry Wager (1815-72). An American soldier, the general-in-chief of the United States Army from 1862 to 1864. He was born in Westerville, N. Y., on January 16, 1815, studied for a time at Union College, and graduated at West Point in 1839. He then served for a year as assistant professor of engineering at West Point; was assistant to the Board of Engineers at Washington in 1840 and 1841; and from 1841 to 1846, except for a few months in 1845, when he was in Europe for the purpose of examining various public works, was assistant engineer in repairing the fortifications of New York harbor. Soon after his return from Europe, he delivered a series of lectures before the Lowell Institute of Boston, which he published in 1846 as *Elements of Military Art and Science*, which in a new edition (1858) was much used during the Civil War as a training manual for volunteer officers. In 1847, during the Mexican War, he was sent to the Pacific Coast, and here served as aide-de-camp to Commander Shubrick from October, 1847, to June, 1848 (for part of this period serving as Lieutenant-Governor of Mazatlán); was chief of staff during Lieutenant-Colonel Burton's campaign in Lower California, and from August, 1847, to December, 1849, served as Secretary of State for California under the military governments of Generals Mason and Riley. In 1849 he was a member of the California Constitutional Convention, and of the committee which draughted the State Constitution. From December, 1852, to August, 1854, he was inspector and engineer of lighthouses, and from April, 1853, to August, 1854, was also a member of the board of engineers for fortifications on the Pacific Coast. He resigned from the army on August 1, 1854; became a successful lawyer in San Francisco; was elected president of the Pacific and Atlantic Railroad in 1855, and from 1850 until 1861 was director-general of the New Almaden quicksilver mines. Soon after the outbreak of the Civil War he reëntered the army (August 19, 1861), with the rank of major-general, and from November 9, 1861, to March 11, 1862, commanded the Department of Missouri, which then embraced Missouri, Iowa, Minnesota, Illinois, Arkansas, and western Kentucky. In this capacity he quickly put a stop to the peculations of contractors, thoroughly trained the disorganized troops, dismissed hundreds of placemen, and in general substituted order and system for the chaos which had resulted from his predecessor's laxity and incapacity. He planned the western campaign of 1862, and on April 11th assumed command in person at Pittsburg Landing (Shiloh). On May 30th his forces entered Corinth. On July 11th he was appointed General-in-Chief of the Armies of the United States, and at once proceeded to Washington, where he served in this capacity until March 12, 1864, after which, until April, 1865, he was chief of staff of the Army. He then was in command successively of the Military Division of the James, the Division of the Pacific, and the Division of the South until his death. As a soldier he was a strict disciplinarian, an excellent organizer, and a skillful strategist; but his genius was more adapted to the map than to the field, and on many occasions he is considered to have fallen far short of the requirements of a general-in-chief. He published: *Bitumen: Its Varieties, Properties, and Uses* (1841); *A Collection of Mining Laws of Spain and Mexico* (1859); *International Law, or Rules Regulating the Intercourse of States in Peace and War* (1861; abridged ed. for schools and colleges, 1886); and a translation of Jomini's *Vie politique et militaire de Napoléon* (1864).

HALL EFFECT. See Electricity.

HALLEIN, häl'līn. A town in Salzburg, Austria, 10 miles south of the city of Salzburg, on the right bank of the river Salza (Map: Austria, C 3). It is noted for its extensive salt-works and saline baths, and has also important cotton, needle, and button factories. The Dürnberg, a mountain 2388 feet above the level of the sea, contains the largest salt-mine in the Austrian Salzkammergut, from which the salt is conveyed in large wooden conduits to the works within the town. Good rock salt is also obtained from Dürnberg. Hallein dates from the tenth century. Population, in 1890, 5200; in 1900, 6600.

HAL'LEL (Heb., praise). A part of the Jewish hymnal service. The term usually signifies the Egyptian Hallel, so called because of its connection with the Passover festival. This Hallel comprises Psalms cxiii.-cxviii., and is chanted in synagogues on the festivals of the Passover, Pentecost, Tabernacles, and the eight days of the Hannucah festival or Feast of Lights, and also at the close of the meal on the first evening of the Passover. It was this Hallel, or at any rate part of it, that was sung by Christ and His disciples at the Passover meal (Matt. xxvi. 30; Mark xiv. 26). Another Hallel, called the 'great Hallel,' was a general thanksgiving chant. Jewish authorities dispute in the Talmud as to what Psalms it should include. Some identify it with the usual Hallel (Psalms cxiii.-cxviii.); others make it Psalms cxx.-cxxxvi., cxxxv. 4-cxxxvi., or cxxxvi. alone.

HALLELUJAH, häl'lê-lōō'yä, or **ALLELUIA** (Heb. *Halelu Yāh*, praise ye Yahweh). An ascription of praise to God derived from the Old Testament, where it appears at the end of certain psalms, and in general use as an expression of thankfulness. It is retained in the Greek and Latin liturgies in the original form, and was so also by the Church of England in the first Prayer-Book of Edward VI., though it is now translated by "Praise ye the Lord." Being an expression of gladness and triumph, it was reserved for seasons and festivals which expressed these emotions. Thus, in the Roman Catholic Church, it is never used from Septuagesima to Easter; and in some mediæval office books, the office of the Saturday before Septuagesima made a special mention of it, even personifying it, and taking a quaint and tender farewell of it: "Thou shalt go from us, O Alleluia; thou shalt return to us again in peace, O Alleluia." During the entire Easter season, on the contrary, and also in a

slightly less degree during the octaves of Christmas, Epiphany, and Corpus Christi, it is used continually at the end of antiphons, introits, communions, and other parts of the service. The three-fold repetition of it at the end of the mass, called the greater Alleluia, was in the Middle Ages sung by the deacon to a very prolonged melody or neuma. (See NEUMES.)

HALLELUJAH VICTORY. The name given to the victory of the Britons over the Picts, at Mold, Flintshire, Wales, March 30, 430, from the war-cry of the former, which had been suggested by Saint Germain, Bishop of Auxerre, on the eve of the battle.

HALLÉN, hâl-lān′, ANDERS (1846—). A Swedish dramatic composer, born at Göteborg. He was educated under Rheinberger, Reineke, and Rietz, and from 1872 to 1878 was conductor of the Göteborg Musical Union, although he had important interests in Berlin, and resided there most of the time. He composed several important operas, which received their first presentation at the Royal Opera, Stockholm, of which in 1892 he became musical conductor; and also published numerous German and Swedish songs. His music, not generally known outside of Sweden and Germany, is exceedingly popular among the Swedish singing societies of the United States. His compositions include the operas *Harald der Viking* (1881), *Hexfallen* (1896), the song-cycles *Vom Pagen und der Königstochter* and *Traumkönig und sein Lieb*, symphonic poems, and choral rhapsodies.

HALLER, häl′lēr, ALBRECHT VON (1708-77). An eminent physiologist, anatomist, botanist, and poet, born at Bern, Switzerland. Two years after the death of his father, an able lawyer, he went, in 1723, to the University of Tübingen, where he became the pupil of the anatomist Duvernoy. In 1725 he removed to Leyden, where he obtained the degree of doctor of medicine in 1727. He then visited London, whence he proceeded to Oxford, and afterwards to Paris, where for six months he studied anatomy and botany; later he became the pupil of Johann Bernoulli, the celebrated mathematician, at Basel. He returned in his twenty-second year to his native city, and commenced practice as a physician. The professor of anatomy, Meig, having fallen ill, Haller undertook the duties of his class; he likewise devoted much of his time about this period to the botany of the Alps, and also published a descriptive poem, *Die Alpen*. In 1735 he was appointed physician to the hospital, and shortly afterwards principal librarian and curator of the cabinet of medals; but in 1736 he left Bern to become professor of medicine, anatomy, botany, and surgery in the new university at Göttingen. For the next eighteen years he devoted himself wholly to teaching and to original research. He took an active part in the formation of the Royal Academy of Sciences of Göttingen, and the memoirs of the society contain many of his papers. During the period from 1736 to 1753 he published 86 works on medical subjects. He was appointed physician to the King of England in 1739. In 1753 he returned to Bern. Among his most important writings are his *Elementa Physiologiæ Corporis Humani* (1757-66)—by far the most important of his works—and his four *Bibliothecæ*, or critical catalogues of works on botany, surgery, anatomy, and medicine. Haller's eminence as a man of science was duly recognized in his own lifetime. He was ennobled by the Emperor of Germany in 1748, and the universities of Oxford and Utrecht in vain endeavored to obtain him as their professor. His name is especially connected with the doctrine of muscular irritability. (See MUSCLE.) While his name is indelibly recorded in the annals of science, it should also be remembered that by his work as a poet Haller greatly contributed to the movement which toward the end of the eighteenth century brought new life to German poetry. Others of his works were: *Icones Anatomicæ* (1743-50); *Opuscula Pathologica* (1755); and *Opuscula Botanica* (1749). For his *Life*, consult Frey (Leipzig, 1879).

HALLES, âl, LES. A large building on the Grande Place of Bruges, Belgium, erected in the thirteenth century, now used as offices of the city Government, and as a market. Its massive belfry, 350 feet in height, is the subject of Longfellow's poem "The Belfry of Bruges." It contains a remarkable set of chimes dating from 1748.

HALLES CENTRALES, âl säN′trâl′. The great central market of Paris, an enormous group of metal structures consisting of a system of pavilions planned to cover 22 acres. Between the pavilions are covered streets 48 feet in width, with a roof about 48 feet above the ground, intersected by an avenue 105 feet wide. Each pavilion is divided into 250 small shops, rented for 20 centimes a day, and beneath are cellars 12 feet in height. The provisions sold in the market are brought during the night in wagons, the total number of which is estimated at 15,000. The early hours of the morning to 8 o'clock in summer and 9 in winter are devoted to auction sales, after which the retail trade commences.

HAL′LETT, BENJAMIN FRANKLIN (1797-1862). An American statesman and editor, born at Barnstable, Mass., son of Benjamin Hallett (1760-1849), the ship-master and founder of sailors' Bethels. He was educated at Brown University, studied law, worked on a paper in Providence, R. I., and in 1827 became editor of the *Boston Advocate*, from which he resigned in 1831, because his crusades against Masonry, against slavery, and in behalf of temperance were ruining the subscription list. He turned against Henry Clay when the latter refused to commit himself to the Anti-Masonic Party; and when Masonry no longer was an issue, Hallett joined the Democratic Party. Long chairman of its national committee, he did much to nominate Pierce and Buchanan. He was appointed district attorney by the former in 1853, and wrote the Democratic platform in 1856.

HALLETTE, â′lĕt′, A. (1788-1846). A French mechanic, born at Arras, where he founded a machine-shop. He improved the hydraulic press used for the extraction of oil, and invented a new system of propulsion tubes for atmospheric locomotives, the *tube propulseur Hallette*. Consult his monograph with that title (Paris, 1844).

HAL′LETTSVILLE. A city and the county-seat of Lavaca County, Tex., 101 miles west by south of Houston; on the San Antonio and Aransas Pass Railroad (Map: Texas, F 5). It carries on considerable trade in cotton, cottonseed

oil, and live-stock; and has several cotton-gins, a cottonseed-oil mill, etc. The water-works and electric light plant are owned by the municipality. Population, in 1890, 1011; in 1900, 1457.

HALLEVI, JUDAH. See JUDAH, BEN SAMUEL.

HAL'LEY, EDMUND (1656-1742). An English astronomer and mathematician, born at Haggerston, London, the son of a soap-manufacturer. He was educated at Saint Paul's School, and afterwards at Queen's College, Oxford, which he entered in 1673. In 1676 he published a paper on the orbits of the principal planets; also observations on a spot on the sun, from which he inferred its rotation round its axis. In November of the same year he went to Saint Helena, where for two years he applied himself to the formation of a catalogue of the stars in the Southern Hemisphere, which he published in 1678 (*Catalogus Stellarum Australium*). On his return he was chosen a Fellow of the Royal Society, and deputed by that body to go to Danzig to settle a controversy between Hooke and Hevelius as to whether it is profitable to use telescopic or plain sights for astronomical observations. In 1680 he made a tour of the Continent, during which he made observations with Cassini at Paris on the great comet which goes by his name, and the return of which he predicted. His observations on this comet formed part of the foundation of Newton's calculation of a comet's orbit. Halley returned to England in 1681, in 1683 published his theory of the variation of the magnet, and the next year made the acquaintance of Newton. In 1686 Halley published an account of the trade winds and monsoons on seas near and between the tropics, and in 1692 his hypothesis relative to the change in the variations of the magnetic needle. To test the truth of this by obtaining measures of the variations in different parts of the world, he was sent in 1698 in command of a ship to the Pacific; but his crew mutinied, and he was obliged to return. The next year, however, he sailed again, and the result of his observations was a chart for which he was rewarded by the rank of captain in the navy with half pay for life. Soon after he made a chart of the tides in the channel, and surveyed the coast of Dalmatia for the Emperor of Austria. On the death of Wallis, in 1703, he was appointed Savilian professor of geometry at Oxford. In 1705 he published his researches on the orbits of the comets. In 1713, on the resignation of Sir Hans Sloane, he became secretary of the Royal Society; in 1716 he made valuable experiments with the diving-bell, which were afterwards published; and in 1721, after the death of Flamsteed, he became astronomer royal. In this office, and engaged especially in studying the moon's motions, he passed the rest of his life. In 1729 he was chosen a foreign member of the Academy of Sciences, Paris. Halley was the author of numerous other researches of great importance besides those mentioned. His *Tabulæ Astronomicæ* did not appear till 1749. Among his principal discoveries may be mentioned the long inequality of Jupiter and Saturn, and that of the slow acceleration of the moon's mean motion. He was the first to predict the return of a comet, and also to recommend the observation of the transits of Venus with a view to determine the sun's parallax. See COMET.

HALLEY'S COMET. See COMET.

HALLIARDS, or **HALYARDS** (probably a variant of *hallier*, from OS. *halian*, OHG. *halōn*, *holōn*, Ger. *holen*, Eng. *hale*, to haul; connected with Lat. *calare*, Gk. *καλεῖν*, *kalein*, to summon; explained by popular etymology as *haulyards*, or *haleyards*). Ropes used to hoist yards, gaffs, sails, etc. They usually take their name from the object hoisted; as, *topsail* halliards, *jib* halliards, *ensign* halliards, etc.; but in some instances they have other designations, the *crowfoot* halliards (so called because it is made fast to the awnings by several small lines spread out in fancied resemblance to a bird's foot), *throat* and *peak* halliards on gaffs, etc.

HAL'LIWELL-PHIL'LIPPS, JAMES ORCHARD (1820-89). An English antiquary and biographer of Shakespeare, born in Chelsea, London. His taste for original research was exhibited while yet a student at Cambridge, and he was made a fellow of the Royal Society and of the Society of Antiquaries when but eighteen years old. After the founding of the Shakespeare Society in London (1841), he gradually devoted more and more of his time to the study of the great dramatist. Rejecting the popular method of constructing the poet's biography from internal evidence, Halliwell discredited the personal application even of the sonnets, and set himself through years of investigation to collect and sift contemporary and traditional evidence to be found chiefly in Stratford-on-Avon and neighboring villages. The result of his labor was issued in his *Outlines of the Life of Shakespeare* (1st ed. 1881; 9th ed. 1890), but before he left the ranks of Shakespearean critics he had published a superb folio edition of the plays (16 vols., 1852-65). In 1863 he was largely instrumental in preventing the sale of Shakespeare's birthplace, and the foundations of New Place, where he died, and he aided generously in turning the one into a museum, and clearing the site of the other. Ever open to give and receive suggestions or criticisms from other Shakespearean students, his assistance was valuable, both directly and indirectly, through the collections of old literature and Shakespearean and other documents he presented or bequeathed to the Chetham Library, Manchester (1851), Smithsonian Institution, Washington (1852), the Penzance public library (1866-88), the Edinburgh University Library (1872), and the Birthplace Museum (1889). Many of his own numerous books were printed for private circulation only.

HALL MARKS. See PLATE MARKS.

HAL'LOCK, GERARD (1800-66). An American journalist, born at Plainfield, Mass. He graduated at Williams College in 1819, taught at Amherst Academy (1819-21), and after a short course at Andover, at Salem. In 1824 he started the *Boston Telegraph*, which was united with the *Recorder* a year later. He acquired a part interest in the *New York Observer* in 1827, and in 1828 joined David Hale in the management of the *Journal of Commerce*. He built a schooner, the *Evening Edition*, which met incoming vessels at Sandy Hook and brought back news; and in 1833 established a pony express between New York and Philadelphia, which gave the *Journal of Commerce* another great advantage. Hallock opposed abolition, but did much to further libera-

tion of the slaves. He was one of the founders of the Southern Aid Society (1854); and in 1861 the use of the mails was forbidden his paper, and he was indicted for 'encouraging rebels.' Unwilling to give up his principles, he retired from journalism, and lived at Hallock's Castle in New Haven, where he was known as a liberal and generous citizen. Hallock was one of the founders of the Associated Press of New York.

HALLOCK, William Allen (1794-1880). An American editor, brother of Gerard Hallock. He was born at Plainfield, Mass., and was educated at Williams College and at Andover Theological Seminary. From the foundation of the American Tract Society (1825), he was its corresponding secretary until ten years before his death. He edited the *American Messenger*, and in addition to his labors as editor and reviser of the publications of the society, wrote several biographies and many tracts. Consult Knight, *Memorial of William Allen Hallock* (New York, 1882).

HALL OF FAME. See Walhalla.

HALL OF FAME FOR GREAT AMERICANS. A structure on the grounds of the New York University, completed in 1900, and designed to commemorate the achievements of distinguished citizens of the United States. It consists of a colonnade, 500 feet in length, following the curve of a terrace which supports three of the university buildings, and resting on a granite corridor which contains a long hall and five rooms, intended for a museum for the preservation of portraits and mementos of those whose names are inscribed in the colonnade. The colonnade contains 150 panels seven feet long and one and one-quarter feet high, designed to be filled by bronze tablets bearing the name of the person commemorated, the dates of his birth and death, and a selection from his writings. The agreement between the university and the donor of the Hall of Fame provided that no name shall be inscribed except of a person born in what is now the territory of the United States, and of a person who has been dead at least ten years. Fifty names, if selected, were to be inscribed during 1900, and five additional names every five years thereafter, completing the full number by the year 2000. Nominations were received from the general public by the University Senate, who transmitted the names seconded by any member to a board of 100 electors selected from educators, writers, and others interested in American history, 51 votes being necessary to a choice, subject to the final approval of the University Senate. The first fifty names were required to include representatives of a majority of fifteen classes: authors and editors; business men; educators; inventors; missionaries and explorers; philanthropists and reformers; clergymen and theologians; scientists; engineers and architects; lawyers and judges; musicians, painters, and sculptors; physicians and surgeons; rulers and statesmen; soldiers and sailors; distinguished men and women outside these classes. Panels left vacant by these restrictions may be filled the ensuing year. The announcement of the new foundation created wide interest. It was favorably considered by the press, and some papers offered prizes for the lists of names which should approach most closely to the final choice of the electors. The Senate received over 1000 names, of which 200 were submitted to the electors, who were themselves invited to add to the nominations. From the names suggested, the electors chose 29, as follows: George Washington, Abraham Lincoln, Daniel Webster, Benjamin Franklin, Ulysses S. Grant, John Marshall, Thomas Jefferson, Ralph Waldo Emerson, Robert Fulton, Henry Wadsworth Longfellow, Washington Irving, Jonathan Edwards, Samuel F. B. Morse, David G. Farragut, Henry Clay, George Peabody, Nathaniel Hawthorne, Peter Cooper, Eli Whitney, Robert E. Lee, Horace Mann, John James Audubon, James Kent, Henry Ward Beecher, Joseph Story, John Adams, William Ellery Channing, Gilbert C. Stuart, Asa Gray. Of the remaining names, those which received the votes of ten or more electors were by that fact placed in nomination for the next election.

HALLOPEAU, ä'lō'pō'. François Henri (1842—). A French physician, born in Paris and educated there. He was appointed hospital physician in 1877, and became a member of the Academy of Medicine in 1893. Besides special monographs on diseases of the skin, Hallopeau wrote a standard *Traité élémentaire de pathologie générale* (4th ed. 1893).

HAL'LORAN, Lawrence Haynes (1766-1831). An English poet and author, born probably in Ireland. He was first a teacher in a private school near Exeter. Afterwards he took orders, and was chaplain in the English fleet during the battle of Trafalgar. He published a descriptive poem, "The Battle of Trafalgar," in 1806. He went to South Africa as chaplain to the forces there, but owing to his defense of two officers court-martialed for dueling in 1810, and his satirical pamphlet, *Cap-Abilities, or South African Characteristics* (1811), he was banished. On his return to England he led a wandering life, and was ultimately condemned to seven years' transportation for forgery. He opened a school in Sydney, Australia, where he died. His works include: *Odes, Poems, and Translations* (1790); *Lacrymæ Hibernicæ, or the Genius of Erin's Complaint* (1801); and *The Female Volunteer*, a drama (1801).

HALLOW-EVEN, or **HALLOWE'EN.** The name popularly given to the eve or vigil of All Hallows, or festival of All Saints, which being the 1st of November, Hallowe'en is the evening of the 31st of October. In England it was long customary to crack nuts, duck for apples in a tub of water, and perform other harmless fireside revelries. Sometimes there were ceremonies of a more superstitious character, as, for example, charms to discover who should be the husband or wife of the person inquiring. Consult Brand, *Popular Antiquities*, edited by Ellis (London, 1813).

HALLOW-FAIR. A market held in some places in Scotland during November, i.e. at Hallowtide.

HALLSTATT (häl'ständ) **EPOCH.** The name applied to the last stage of bronze or the first stage of iron culture in Europe. It is so called from the necropolis of Hallstatt, Upper Austria, near the border of Salzburg. It is associated with the Celtic language group and the Alpine race of Ripley, who characterizes the

Hallstatt culture of the eastern Alpine highlands as more highly evolved than that of the Neolithic period in the West due to Oriental influences. It appeared a thousand years or more before the Christian Era. It flourished chiefly in Carinthia, Southern Germany, Switzerland, Bohemia, Silesia, Bosnia, Southeastern France, and Southern Italy. Consult Deniker, *Races of Man* (London, 1900).

HÄLLSTRÖM, hĕl'strōm, Ivar (1826—). A Swedish composer, born in Stockholm. He was educated for the legal profession, and was private librarian to the Crown Prince, who became Oscar II. of Sweden. In 1861 he was appointed the successor of Lindblad as director of the National School of Music at Stockholm. He is essentially a national composer, and all his writing is marked by the characteristics of Scandinavian music in general, and the Swedish folk-music in particular. He composed several operas, the most successful of which was *Den Bergtagna*, or the *Mountain King*. Other works include the operas, *Hertig Magnus; Den förtrollade katten*, or *The Enchanted Cat; Neaga*, or *Nyaga* (libretto by Carmen Sylva); *Idyl* for soli, chorus, and orchestra, which, in 1860, won the prize of the Musical Union of Stockholm.

HALLUCINATION (from Lat. *hallucinatio, alucinatio*, hallucination, from *alucinari*, to wander in mind). In the states of dreaming, hypnosis, and insanity, we find a derangement, temporary or permanent, of the normal train of ideas (see Association of Ideas) and their attendant affective processes; in hallucination and illusion (q.v.) we have an abnormal condition of single ideas or representations. (See Idea.) An illusion may be defined here, provisionally, as a distorted perception; an hallucination is "an image of memory which differs in intensity from the normal" (Wundt), a centrally aroused idea which by its strength and vividness simulates the reality of an external object, and is, therefore, accepted as real by the perceiving subject. Hallucinations are characteristic of certain forms of insanity; the religious visionary holds intercourse with the Virgin Mary; the melancholiac hears insulting or threatening voices (delirium of persecution). Sane persons, especially those engaged in intellectual pursuits, are also liable to hallucinations after a period of concentrated mental work. The commonest forms of hallucination are, perhaps, the 'hypnagogic,' visions or voices seen or heard in the drowsy interval preceding sleep. Hallucinations are ordinarily auditory or visual, though they may also arise within the spheres of taste, smell, and touch.

Hallucinations may be set up by hyperæmia of the brain, membranes, and cortex; by the action of drugs (morphium, ether, etc.); and by disturbances of brain nutrition, resulting in anæmia. The common factor in all these cases is a deposition, in the cerebral cortex, of products of decomposition, which at first enhance the irritability of the area affected, and presently serve themselves as stimuli to brain action.

Bibliography. Wundt, *Grundzüge der physiologischen Psychologie*, vol. ii. (Leipzig, 1893); Mueller, *Ueber die phantastischen Gesichtserscheinungen* (Coblenz, 1826); Brière de Boismont, *Des hallucinations* (Paris, 1845); Sully, *Illusions* (New York, 1881); Parish, *Hallucinations and Illusions* (New York, 1897).

HALLUF. See Wart-Hog.

HALLUIN, à'lwăn'. A town in the Department of Nord, France, on the Belgian frontier. It has extensive manufacturing establishments of cotton, linen, etc. Population, in 1901, 16,500.

HAL'LUX VAL'GUS (Lat., wry toe). The technical name of a deformity of the great toe, which is generally caused by wearing too small a shoe, the toe, for lack of room, being forced out of its normal position so that it sometimes overlaps the other toes. This malformation, which is most common among women, not unfrequently results in osseous changes which may necessitate amputation of the toe.

HALLWICH, häl'vĭk, Hermann (1838—). An Austrian politician and historian, born at Teplitz, and educated at Prague. From 1871 to 1897 Hallwich was a member of the Austrian House of Deputies, allied with the German Left, and prominent as a speaker on questions dealing with commerce and tariff. As an historian he is best known as an ardent defender of Wallenstein. He wrote: *Wallensteins Ende. Ungedruckte Briefe und Akten* (1879); *Heinrich Matthias Thurn als Zeuge im Prozess Wallenstein* (1883); and *Gestalten aus Wallensteins Lager* (1885).

HALM, Friedrich, the pseudonym of Münch-Bellinghausen, E. F. J., Baron von (q.v.).

HALM, hälm, Karl (1809-82). A German philologist, born at Munich in 1809. From 1839 he taught at Speier and Hadamar; in 1849 he became rector of the newly founded Maximiliansgymnasium at Munich, and in 1856 professor in the university there and director of the royal library. His principal works are critical editions of *Cicero* (1845-56), *Quintilian* (1868-69), and *Cornelius Nepos* (1871); *Cicero's Orations* with commentary (1845-48); and *Select Orations of Cicero* (1854-66); in the Teubner series, *Æsop's Fables* (1852), *Florus* (1854), and *Tacitus* (4th ed. 1891). His shorter treatises comprise: *Lectiones Stobenses* (Speier, 1841-42); the *Catalogue of the Fathers of the Latin Church* (1865); and his rich *Catalogue of the Munich Library*, vol. i. (1865).

HALMA, àl'mà', Nicolas (1755-1828). A French mathematician, born at Sedan, and educated there and in Paris. He took holy orders, and was principal of the college at Sedan (1791-93). Removed from this position by the suppression of the colleges, he went to Paris and was in quick succession engineer, surgeon, professor at the Prytanée and at the Military School of Fontainebleau, librarian and instructor of the Empress, and librarian of the Department of Bridges and Highways. Then he undertook, at the instance of Delambre, the translation of Ptolemæus on astronomy, together with the commentaries of Theon on the first two books, and other material (1813-16). But the success and merits of his work were small, and appointments as assistant curator of the Bibliothèque Sainte Geneviève and as canon of Notre Dame were much more remunerative. His further works include translations and criticisms of Greek mathematicians and chronologists, and text-books of geography, besides many miscellaneous writings.

HALMAHERA, häl'mà-hā'rà. An island of the Moluccas. See Gilolo.

HALMOTE, or **HALIMOTE** (from *hall* + *mote*, AS. *gemot*, assembly). An ancient English court, held by the lord of a manor for the purpose of administering the laws and customs of the manor. It was composed of the freeholders of the manor, and came later to be known as the *Court Baron* or manorial court. See COURT BARON.

HALMSTAD, hälm'städ. A town in Sweden, and capital of Halland Län, situated at the mouth of the Nissa on the east shore of the Cattegat, about 76 miles south-southeast of Göteborg (Map: Sweden, E 8). The town possesses a castle, now the residence of the Governor; a church dating from 1462, and a high school. It is an important railroad centre, and has regular steamship connection with most of the Swedish coast towns as well as with Copenhagen and Lübeck. It is the chief export town for a large part of Southern Sweden. The chief manufactures are cloth, beer, and machinery. The town exports lumber, fish (the river abounding in salmon), oats, butter, and woolen goods; the chief imports are food-stuffs, fertilizers, petroleum, and jute. Population, in 1901, 15,400. Halmstad received municipal privileges in 1307, and has been the scene of many important events in the history of Sweden, among them the defeat of the Danes by Charles XI. in 1676.

HALO (Lat. *halos*, from Gk. ἅλως, halo, disk, threshing-floor, from ἀλεῖν, *halein*, to grind). The general name given to a class of optical phenomena, described more specifically as GLORY, CORONA, ANTHELIA, PARHELIA, MOCK SUNS, SUN-DOGS, PARASELENA, MOCK MOONS, etc. When the light of the sun or moon or bright star shines through a delicate cloud, or layer of fog or mist, a variety of optical phenomena are produced which may be classified as (a) circular rings around the sun or moon or star as a centre; (b) horizontal rings around the zenith as a centre; (c) partial arcs around the sun or the zenith; (d) vertical columns of light either through the sun or moon, or through points around the horizon symmetrically placed with reference to the sun; (e) elliptical rings around the central luminary. If the observer is so located that his shadow is projected upon a cloud, a bank of fog, or a meadow covered with drops of dew, he may see similar circles of light around his shadow or his anti-solar point, which circles have been described under ANTHELIA. The circles around the sun really occur much more frequently than those around the moon, but are less frequently observed, owing to the brightness of the sun; they can, however, easily be seen by viewing the reflection of the sky in the surface of still water or an unsilvered glass plate.

Halo is the general term by which we designate a variety of optical phenomena whose study is a branch of physical optics. The circular rings of class (a), when they are quite near the sun, namely, within fifteen degrees, and, in fact, usually within five degrees, are the result of the interference of waves of light that have passed around the minute globules of water, or sometimes of dust, in the hazy atmosphere. This process was called diffraction by Sir Isaac Newton, who showed that in the rear of every small object there is a bright spot instead of a shadow, and surrounding this bright spot a series of concentric rings or bands of brilliant colors. If one looks at the sun through a mass of small particles or fibres of rather uniform size, as those of wool, a similar series of concentric rings will be seen, the angular diameter of which increases as the diameters of the fibres diminish; on this principle Dr. Thomas Young based the construction of his eriometer for the determination of the diameter of small particles and the fibres of textile materials. The largest rings that have been seen about the sun are those known as Bishop's rings, observed after the eruption of Krakatoa. These are about ten, twelve, or fifteen degrees in radius, and must have resulted from the presence of a very delicate layer of the finest imaginable dust or aqueous globules whose diameters probably did not exceed 0.0002, or one five-thousandth of an inch. On the other hand, particles that have a diameter of 0.0013 may produce rings having a radius of one degree, which would, therefore, very closely encircle the sun or moon, whose radius is only one-quarter of one degree. All these circles are known as 'glories.'

For large globules of water, such as compose the lower clouds, the diffraction phenomena become inappreciable, and are replaced by more complicated phenomena of reflection and refraction. In the higher alto-stratus and alto-cumulus clouds formed of small globules of water the range of diameters is usually rather large, and a series of overlapping circles is seen when the sun or moon is behind them. In the highest cirrus clouds the particles of ice form more delicate circles. For particles of a much smaller size than those that usually occur in clouds, the phenomena of diffraction are replaced by the colors of thin plates. Brilliant illustrations of these clouds occurred in the green, blue, and red suns seen when the sun was examined through the clouds of vapor that were thrown off by the eruption of Krakatoa in 1883. The study of this subject led to the experiments by Kiessling, and more especially by Dr. Carl Barus, whose publications on cloudy condensation form the stepping-stones to our present limited knowledge of the growth of minute water-globules from a diameter somewhat less than the tenth of the length of the sodium-wave up to a diameter equal to that wave-length itself. Consult *Bulletin* No. 12, United States Weather Bureau, 1895.

In the small circles or glories referred to, the red circles are outermost, and the blue ones within; the term 'halo' is applied by meteorologists more especially to circles of larger radius formed by reflection and refraction within the drops of water, such as the rainbow and the halos of twenty-two and twenty-five degrees radius. In rainbows or halos formed by one reflection the red is innermost, namely, on the side toward the sun; and the blue is outermost, or away from the sun. Circles formed by two reflections have the red outside and the blue inside.

The complex and beautiful halo phenomena that are seen in the winter time result from the reflection and refraction of light by innumerable crystals of ice or simple snowflakes, which produce, in general, a hazy appearance in the air. When the sky is cloudless and of a pale blue near the zenith, these crystals of ice, settling down very slowly through the still air, may be sufficiently numerous to reflect enough sunlight to produce gorgeous effects. The simplest ice crystal is a regular hexagonal prism whose ends are either planes perpendicular to the axis or

more commonly hexagonal pyramids. When a ray of light within a prism strikes an inner surface at an angle of incidence of about 80.5° it is totally reflected. When a beam of light passes through the two sides of a prism whose angle is 60°, in such a way as to suffer the minimum deviation, the latter will amount to about 21° 50′. Bearing these principles in mind, as also the fact that in an ordinary cloud the prisms have every possible position, we see that the general result will be that crystals that are near the position of minimum deviation will conspire to refract the light in the same direction; some of the others will send the light in any direction, so the general result will be a bright circle of light surrounding the sun as a centre; its angular radius from the sun will be about 21° 50′, or the so-called halo of 22°, which has a dark interior, an inner reddish edge, and a bright exterior.

In still air the slender prisms of ice are likely to be suspended more nearly vertically. Therefore, their surfaces reflect a little sunlight as from a vertical mirror to the eye. When the observer is in the midst of a cloud or fog of such prisms, he sees a reflection of the sunlight forming a band of white light around the horizon at about half the apparent angular attitude of the sun. This is called the *parhelic circle*. When other combinations of reflections from snow crystals occur so as to double or treble the brightness of particular spots in this parhelic circle, these spots are called mock suns, sun-dogs, or parhelia. A vertical arc may be produced by the reflections from the horizontal surfaces of snowflakes, and this arc may extend for a very considerable distance above and below the sun.

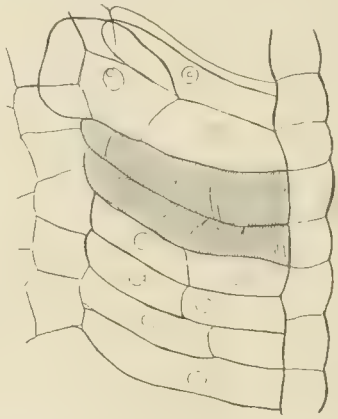
The most brilliant attendant of a halo is the tangential arc, which is sometimes seen touching the halo of 46° at its summit; it can only be seen when the sun's altitude is between 12° and 30°, and is due to the reflection of the sunlight through ice needles whose refracting edges are horizontal. The geometrical study of halos was most thoroughly worked out by Bravais, in his memoir of 1847 in the *Journal de l'Ecole Polytechnique*, vol. xviii. (Paris); it is also quite fully presented by Mascart, *Traité de l'optique* (Paris, 1896). The complete application of the theory of interference to the explanation of the phenomena of the supernumerary rings that accompany halos, and especially rainbows, was given by Dr. Thomas Young in 1804, but has more recently been presented in both elementary and analytical methods by Dr. J. Pernter, of Vienna. The idea that cloudy particles are not solid small spheres of water, but hollow vessels like a soap-bubble, was abundantly disproved by Clausius, but still finds occasional mention in popular text-books. However, the arguments for and against this vesicular theory (consult Kober, in Poggendorn's *Annalen*, Berlin, 1871) show that it can have no standing in science. An exhaustive work on optical meteorology was in course of preparation in 1903 by Prof. J. Pernter of Vienna.

HALOANDER, hä'lō-ăn'dēr, GREGORIUS (1501-31). A German jurist whose family name was Meltzer. He was born at Zwickau, and was educated in Leipzig. He published, at Nuremberg, under the protection and with the help of Wilibald Pirkheimer: the *Pandectæ* (1529); *Institutiones* (1529); *Codex Justinianeus* (1530); and, in Greek with a Latin version, *Novellæ Constitutiones* (1531). He also edited Epictetus's *Enchiridion* (1529). Consult: Schmidt, *Symbolæ ad Vitam Gregorii Haloandri* (Leipzig, 1866), and Flechseg, *Gregor Haloander* (Zwickau, 1872).

HAL'OGENS (from Gk. ἅλς, *hals*, salt + -γενης, *-genēs*, producing, from γίγνεσθαι, *gignesthai*, to be born). The name given to the four non-metallic elements, fluorine, chlorine, bromine, and iodine. The term was originally used by Berzelius, on account of the ease with which these elements form salts. The halogens combine directly with many of the other elements, much heat being evolved in the process. With hydrogen, they form the well-known hydrofluoric, hydrochloric, hydrobromic, and hydriodic acids, respectively. The halogens exhibit an unmistakable gradation of physical properties. Thus, fluorine is a colorless gas; chlorine is a yellowish-green gas easily condensed to a liquid; bromine is a dark-red volatile liquid; iodine is a lustrous grayish-violet solid. See FLUORINE; BROMINE; CHLORINE; IODINE.

HALOPH'ILOUS PLANT (from Gk. ἅλς, *hals*, salt + φίλος, *philos*, loving). See HALOPHYTE.

HAL'OPHYTE (from Gk. ἅλς, *hals*, salt + φυτόν, *phyton*, plant). Plants which grow naturally in soils or waters rich in various salts, especially those with alkaline reactions. Common salt is quantitatively much the most important of these substances, although in certain localities alum, saltpetre, and other salts are abundant



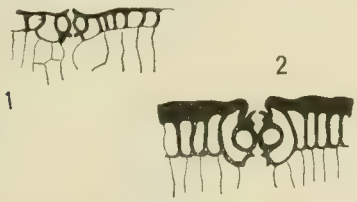
HALOPHYTES.

Longitudinal section of the stem of samphire, showing obliquely arranged palisade cells, also isolated water tracheids.

enough to be of ecological importance. The vegetation of the oceans and salt seas and lakes, as well as that along their marshy shores, represents the greater part of the halophytic vegetation of the world; however, there are great interior halophytic areas in arid climates, where seas or salt lakes have formerly existed. Sometimes salt springs or small areas of salty soil disclose a halophytic vegetation. While a great many species have, perhaps, become perfectly adjusted to soils or waters rich in salt, it is, nevertheless, true that these conditions are unfavorable for the development of the great majority of plants; and experiments have shown that many halophytes may grow as well, if not better, in soils or waters

with a low salt content. This is not true, however, in the case of such extreme halophytes as the marine algæ.

EFFECTS OF SALT ON THE GROWTH AND STRUCTURE. Almost all plants can take up limited quantities of ordinary salt without injury, although most plants probably do not need it in their normal life processes. All but natural halophytes and a few xerophytes soon perish if large quantities of salt are present in the soil. Probably the injurious effects of salt are due to the increased difficulty of osmotic absorption by the root, and to the inhibiting action of salt on the plant's normal life processes. Structures and conditions that have been experimentally shown to result from growth in salt solutions are reduction in leaf surface, increase of leaf thickness (due to richer development of palisades and water-storage cells), reduction of intercellular spaces. All of these are well-known xerophytic characters, so that halophytes, with the exception of submerged marine plants, are now regarded as a class of xerophytes whether the soil in which they grow be dry or wet. The structures noted, as well as others, doubtless serve to reduce transpiration, and it may be supposed that this is an advantage, because of the lessened osmotic absorption. See XEROPHYTES.



HALOPHYTES.

Cross-section of leaf of Sonneratia acida: 1, in ordinary soil condition; 2, when grown in salty soil, showing the great thickening of the cuticle in the latter.

Halophytes belong to a great number of families, some of which, as the Chenopodiaceæ, Frankeniaceæ, Plumbaginaceæ, are particularly rich in halophytic members. One of the most interesting features of halophytes is the wide distribution of their species. It is easy to see how coastal forms should be similar over wide areas, but why the same forms should also occur in many continental interiors is not so apparent. Perhaps the former interior seas had marine connections; in this case the interior halophytes form the best-known group of relict plants (q.v.). It must be remembered, however, that migrations are easier than has been generally supposed, and that given a congenial habitat in a congenial climate, a species or genus characteristic of such places is pretty likely to appear sooner or later. The various halophytic formations and societies are treated under BEACH PLANTS; BENTHOS; DESERT VEGETATION; DUNE VEGETATION; MANGROVE SWAMP; PLANKTON; and SWAMP.

HAL'PINE, or **HALPIN,** CHARLES GRAHAM (1829-68). An American soldier and poet, born in Oldcastle, County Meath, Ireland, and educated at Trinity College, Dublin. After a short journalistic experience in Dublin, he came to America in 1851. For a few months he was the associate editor of the Boston *Post;* served as the Washington correspondent of the New York *Times,* and after short connections with various metropolitan papers, was associate editor of the New York *Times* until 1857, when he became editor-in-chief of the New York *Leader.* At the outbreak of the Civil War he enlisted in the Sixty-ninth Regiment, New York Volunteers. He served as assistant adjutant-general on General Hunter's staff and under General Halleck, accompanied the former on his Shenandoah expedition in 1864, resigned from the service soon afterwards on account of failing health, and was brevetted a brigadier-general of volunteers. His experiences and observations as a soldier found humorous expression in the popular poems and stories written over the pen-name of Miles O'Reilly. He became editor of the New York *Citizen* in 1864, and strongly advocated civil-service reform; was elected register of New York County in 1867, and died in the following year from his continued literary exertions. His best-known writings, apart from fugitive poems, are: *Lyrics by the Letter H* (1854); *Life and Adventures, Songs, Services, and Speeches of Private Miles O'Reilly* (1864); and *Baked Meats of the Funeral: A Collection of Essays, Poems, Speeches and Banquets of Private Miles O'Reilly* (1866). His complete *Poetical Works* appeared in 1869.

HALS, häls, FRANS (c.1584-1666). A Dutch portrait and genre painter, the greatest, next to Rembrandt. He was born at Antwerp, not at Mechlin, as is often stated, probably in 1584. He went to Haarlem before 1600, and studied there under Karel van Mander (q.v.). He led a careless and jovial life, but was held in high esteem by his fellow townsmen. Like his brother, Dirk, he was an honorary member of the chamber of rhetoric; he belonged to the civic guard, and was head of the painters' guild, and of an important school of painting. He was twice married. He was usually in debt; and in 1664 the municipality of Haarlem allowed him a yearly pension of two hundred florins, which he enjoyed until his death on September 7, 1666.

The artistic development of Hals may best be studied in his large *doelenstukken* (portrait groups of the city guard) in the Museum of Haarlem. The earliest of these, the "Banquet of the Officers of Arquebusiers of Saint George" (1616), is in his first manner. There are traces of the old Haarlem School, in particular of Van Mander, but Hals is already an independent master. His grouping is freer than that of the old school; his color, though still brown in tone, is more luminous, and applied in a broader manner; and his characterization far superior.

His second manner (1627-39) is represented by three *doelenstukken* in the Haarlem Gallery: the "Banquet of Officers of the Arquebusiers of Saint George and Saint Andrew" (1627); "Officers of Saint Andrew" (1633), the most serious and finest of the groups; and the "Officers and Sergeants of Saint George" (1639), nineteen figures, among which is that of the artist himself. To these may be added a similar piece, the so-called "Shooting Gallery" (1637), in the city hall of Amsterdam. During this period his pictures are characterized by a light gray tone, greater breadth of execution, and greater seriousness of character. Another portrait group of the Haarlem Museum, the "Governors of the Elizabeth Hospital" (1641), in the peculiar treatment of light and in its rich golden hue, shows the influence of Rembrandt—an influence, however, which was only temporary and experimental. Before 1635 his color began to grow deeper, and

a darker gray tone pervaded his pictures. His treatment continued to grow broader, attaining a breadth perhaps never achieved by another master. This last manner is represented in the Haarlem Museum by two fine portrait groups: "Governors of the Hospital for Old Men," and the "Lady Governors of the Hospital for Old Women," both of 1665.

Frans Hals was one of the greatest portrait painters of all times. All details are subordinate to the character and expression of the face; the colors, however bright, serve to emphasize the carnation of the face. No painter has exceeded him in expression. He left over one hundred and sixty works, most numerous in Dutch and German galleries, and in those of Paris, Saint Petersburg, and New York.

The most interesting example of the portraits of the first period is that of the "Artist and His Wife in a Park" (1624), at Amsterdam; others are those of an unknown "Nobleman and His Wife," at Cassel; of "Jacob Olycan and His Wife" (1625), in The Hague; and of a "Young Married Couple" (1627), in Berlin. The Louvre possesses three fine examples of his second manner: "Nicholas Berensteyn and His Wife" (1629); the "Berensteyn Family," an admirable group composed of father, mother, six children, and two nurses; and a "Girl of the Berensteyn Family," the most charming of Hals's feminine portraits. Other prominent examples are the "Nurse with Child," in the Berlin Museum; the life-size figure of William van Heythuysen, in the Liechtenstein Collection, Vienna, his masterpiece, according to Bode; another of the same subject in the Museum of Brussels.

The portraits of his last period show no decline. Among the best are those of an old man and his wife, in private possession, Paris; of Descartes, in the Louvre; the "Young Man in a Soft Hat," at Gotha; and three well-known portraits of unknown men in the Hermitage at Saint Petersburg. The Metropolitan Museum of New York has portraits of an unknown man, and of Hals's wife, and one of two gentlemen, attributed to him.

Hals is the father of Dutch genre painting. In his genre pieces he found an amusement and freedom not possible in ordered portraits. They are painted in a broader style with more humor. Most of them date from his early period. Among the best are: the "Jolly Trio" (1616), in private possession in the United States, of which there is a replica by Dirk Hals in the Berlin Museum; the "Herring Vender" (1516), in the Baring Collection, London; "Junker Ramp and His Mistress," in private possession, Haarlem. To the same period belong a number of pictures of singing boys and flute-players in the galleries of Brussels, Berlin, Königsberg, Schwerin, etc.; and of jovial drinkers at Amsterdam, Cassel, etc. Especially fine examples of this genre are the "Fool Playing a Lute," at Amsterdam, and "La bohémienne," in the Louvre. The original of the famous "Hille Bobbe," an old woman with an owl upon her shoulder and a tankard of wine in her hand, is in the Berlin Museum. There are replicas at Dresden and in the Metropolitan Museum, New York, probably by Frans Hals the younger. The latter museum also possesses a genre piece of a "Smoker."

Hals was the head of a large school, and exercised a great influence upon Dutch painting. Among his pupils were Verspronk, the portrait painter; his brother, Dirk Hals, and Adriaen Van Ostade, genre painters; the greatest genre painters of Holland—Metsu, Ter Borch, and Steen (q.v.)—were under his influence. Five of his sons were painters. Of these the most important was FRANS HALS THE YOUNGER (1620-c.1669), who copied his father's pictures. Examples of his independent works are in the Arenberg Gallery and in the Royal Palace at Brussels, in the Schwerin Gallery, and in the museums of Berlin and Königsberg.

Consult: Van der Willigen, *Les artistes de Haarlem* (Haarlem, 1870); Vosmaer and Unger, *Frans Hals Galerie* (Amsterdam, 1873); Knackfuss, *Frans Hals* (Leipzig, 1897). The chief authority on Hals is W. Bode; see his *Studien zur Geschichte der holländichen Malerei* (Braunschweig, 1883).

HÄLSCHNER, hĕlsh'nĕr, HUGO PHILIPP EGMONT (1817-89). A German criminalist. He was born at Hirschberg, Silesia, was educated at Breslau and Berlin, and in 1847 was made professor of law at Bonn, where he lectured on the history and nature of criminal law. In 1868 he was made a life member of the Prussian Upper House. His principal publications are: *System des preussischen Strafrechts* (2 parts, 1858 and 1868); *Das Recht Deutschlands im Streit mit Dänemark* (3d ed. 1863), an important work in which the disputes between Germany and Denmark are treated from the standpoint of the legal historian.

HAL'STEAD, MURAT (1829—). An American journalist, born in Ross Township, Butler Co., Ohio. He was educated at Farmers' College, near Cincinnati, became a member of the staff of the Cincinnati *Commercial* in 1853, and in 1865 its chief owner. This journal was subsequently consolidated with the *Gazette* of Cincinnati, as the *Commercial-Gazette*, of which he became the editor-in-chief. He was afterwards editor of the Brooklyn *Standard-Union*, and then became a special newspaper correspondent and magazine writer, in which capacity he visited the Philippine Islands during the Spanish-American War. His books include a *Life of William McKinley*, a *Life of Admiral Dewey*, and *The Galveston Tragedy*.

HAL'STED, BYRON DAVID (1852—). An American botanist, born at Venice, N. Y. He was educated at the Michigan Agricultural College, and, after two years' teaching in that institution, at Harvard. In 1879 he became editor of the *American Agriculturist*. He was elected professor of botany at Iowa Agricultural College (1885), and at Rutgers College (1889). Halsted gained most fame by his knowledge of weeds and fungi injurious to agriculture. He wrote: *The Vegetable Garden* (1882); *Farm Conveniences* (1883); and *Household Conveniences* (1883).

HALSTED, GEORGE BRUCE (1853—). An American mathematician, born at Newark, N. J. He graduated at Princeton in 1875, and studied at Johns Hopkins and in Berlin. He was instructor in Princeton until 1884, when he was appointed to the chair of mathematics in the University of Texas. Halsted wrote on mathematics, philosophy, and formal logic in the *Popular Science Monthly*, in *Mind*, and the *American Journal of Mathematics*; and published: *Mensuration* (1881); *Elements of Geometry* (1885);

FRANS HALS

"HILLE BOBBE," FROM THE PAINTING IN THE NATIONAL GALLERY, BERLIN

Elementary Synthetic Geometry (1892); *Pure Projective Geometry* (1895); and *Non-Euclidean Geometry* (1900).

HALS'WELLE, KEELEY (1832-91). An English painter, born in Richmond, Surrey. He first worked as an engraver, and afterwards studied at the Royal Scottish Academy in Edinburgh. He exhibited "Vino Veritas" in 1857, and "The Bridge of Sighs" in 1858. The best known of his Roman pictures are "Roba di Roma" and "Non Angli, sed Angeli." His landscapes usually treat Surrey scenery. His work is marked by beautiful color and free, vigorous handling.

HALYS, hā'lĭs. The old name of the Kizil Irmak (q.v.), the largest river in Asia Minor.

HALYSITES, hăl'ĭ-sī'tēz (from Gk. ἅλυσις, *halysis*, chain). A fossil coral found in rocks of Ordovician and Silurian age in North America, Europe, and Australia, and distinguished by the chain-like figure produced by a cross-section of its mass upon the surface of a rock in which it is imbedded. Halysites is a very characteristic fossil of the Niagara series, and two species, namely, Halysites catenularius and Halysites escharoides, are common in the Silurian coral reefs of North America and England, where they are known as 'chain corals.'

HAM, äN. A town and fortress in the Department of Somme, France, on the Somme, 36 miles by rail from Amiens (Map: France, J 2), and 70 miles north-northeast of Paris. It is celebrated for its mediæval castle, strengthened by modern additions, which has frequently served as a prison for political offenders. Louis Napoleon, afterwards Emperor, was a prisoner here from 1840 to 1846. After the coup d'état of December 2, 1851, the Republican generals Cavaignac, Lamoricière, Changarnier, and others were kept here for some time. The donjon, a round tower, is 110 feet high, 110 feet broad, and has walls 36 feet thick. Other noteworthy features of the town are the twelfth-century Romanesque Church of Notre Dame, recently restored, a belfry, public library, and museum. Population, in 1901, 3300.

HAM (AS. *hamm*, OHG. *hamma*, dialectic Ger. *Hamme*, ham, haunch; connected with Gael. *cam*, Lat. *camur*, crooked). Properly, the hind part or angle of the knee; but usually applied to the cured thigh of the ox, sheep, or hog, more especially the last. Ham-curing and bacon-curing are performed in a variety of methods, each country or district having its own peculiar treatment. The essential operations are salting and smoking. The curing of pork-hams forms a large and important item in the industry of various countries. See PACKING INDUSTRY.

HAM (perhaps originally the name of a deity to be compared with the first element in the name Ammizaduka, an early Babylonian king). According to Gen. x. 6-20, the second son of Noah, and ancestor of a group of people which includes Cush (Ethiopia), Egypt, Put, Canaan, and Babylonia, represented by Nimrod. The origin and meaning of the name are quite obscure. Older explanations connecting the word with a supposed name for Egypt, *Kemi* or *Chemi*, signifying 'black,' or rendering it as 'hot' with reference to the district from which the Hamites came, are now discarded. The critical view of the tenth chapter of Genesis is that it is a composite production which has undergone much manipulation at the hands of editors. Ham has been substituted for Canaan, who, according to Gen. ix. 25, is in reality the 'younger son' of Noah, and who merited the curse of his father. According to an earlier version, the three sons of Noah were Shem, Canaan, and Japhet—representing three groups settled in Palestine. When the originally local tradition, through circumstances which cannot be considered here, was extended into one of general ethnic significance, Japhet, originally Phœnicia (as it seems), became a term for the distant outlying nations of the north and northeast, and the near and distant islands to the west in the Mediterranean; Shem became the ancestor not only of the Hebrews and their immediate relatives, but also of other nations like the Elamites (i.e. the Persians) who were favorable to the Hebrews; while Ham became the designation for all nations who, as enemies of the Hebrews at one time or the other, are 'accursed.' Hence, Egypt, Babylonia, Assyria, and the Canaanites with their offspring are put among the Hamites. Viewed in this light, the list of nations in the tenth chapter of Genesis, while not altogether lacking in historical value, is of interest chiefly as revealing the geographical horizon of Jewish writers in the sixth and fifth centuries B.C., and the principles guiding these writers in their grouping of the nations known to them. A problem that is still unsolved is to determine the source whence the writer or writers obtained the name Ham, which will also explain the substitution of Ham for Canaan. Consult the commentaries on Genesis (chapter x.) by Gunkel, Holzinger, Strack, Dillmann, Delitzsch, Ball, and others; also Knobel, *Die Völkertafel der Genesis* (*Giessen*, 1850); Glaser, *Geschichte und Geographie Arabiens*, vol. ii. (Berlin, 1890).

HAM, EAST and WEST. Two English municipalities, east suburbs of London, from which they are separated by the river Lea (Map: London, D 9). Their growth and importance are due to their proximity to the metropolis, and to the numerous factories established in their midst to evade the prohibitive enactments of the Metropolitan Board of Works. Both city administrations are of a high order. West Ham owns a fine town hall, municipal buildings, a public hall, free libraries, a well-equipped technical institute, an electric-lighting plant, electric tramways, isolation hospitals, a lunatic asylum, public baths, and recreation grounds. East Ham is well provided with libraries, parks, and recreation grounds, electric lighting, and tramways, a new town hall, technical institute, and public baths. Population, East Ham, in 1891, 32,700; in 1901, 96,000; West Ham, in 1891, 204,900; in 1901, 267,300.

HAMA, hä-mä' (the *Hamath* of the Bible). A city of Syria, situated on both banks of the Orontes, about 120 miles north of Damascus (Map: Turkey in Asia, G 5). It is irregularly laid out with narrow, crooked, ill-paved streets, and houses built mostly of mud. It has a number of mosques and well-stocked bazaars. Its manufactures consist chiefly of rough woolen mantles, and cotton fabrics; trade is with the neighboring Bedouins. The population is estimated at 50,000. See HAMATH.

HAMADAN, hä'mȧ-dän'. A town of Western Persia, in Irak-Ajemi, situated in a very

fertile and picturesque region, about 180 miles southwest of Teheran (Map: Persia, C 4). It is unattractive in appearance, but has a number of fine well-stocked bazaars, several mosques, and two tombs of special interest, one claimed to be that of Mordecai and Esther, and the other of the Arabian philosopher Avicenna (q.v.). Hamadan is famous for its copper ware, leather trunks and saddlery, carpet, silver, and gold works. Commercially the town is of considerable importance, owing to its position on the route between Bagdad and Teheran. The population is estimated at 25,000, including about 1000 Jewish families. Hamadan is generally believed to occupy the site of the ancient Ecbatana (q.v.).

HAM'ADRY'AD (Lat. *hamadryas*, from Gk. *ἁμαδρυάς*, *hamadryas*, from *ἅμα*, *hama*, with + *δρῦς*, *drys*, tree). A venomous serpent, the largest of Oriental cobras (*Naja* or *Ophiophagus bungarus*). It is nowhere numerous, but widely distributed, occurring in damp, forested regions from Ceylon to the Philippines, and is known as the 'giant cobra,' and in some parts of India as 'sunerkor.' It grows to a length of 13 feet, and probably more, and has a hood which it can expand; but differs from the common cobra by the presence of a pair of large shields on the head behind the parietals. It is variable in color, but usually, when adult, is some shade of brown, with broad dark cross-bands. It is fierce in disposition, rarely showing any fear of man (though exhibiting much intelligence in captivity), and often climbs trees and conceals itself in their hollows. It feeds altogether upon snakes, which it chases swiftly, seizes behind the head, and swallows head foremost. It is said that a man bitten by a vigorous snake of this species will die in three minutes, and an elephant in two hours. Were it not so rare it would be the most dangerous reptile in the world. See COBRA and KRAIT. Consult Fayrer, *Thanatophidia of India* (London, 1874).

HAMADRYAD. The mandrill. See BABOON.

HAMADRYADS. See NYMPHS.

HA'MAN. A character introduced into the Book of Esther as an 'Agagite' (Amalekite) chief minister of Ahasuerus, King of Persia. When Mordecai the Jew refused to obey the order to bow down before Haman, the latter made an attempt to destroy all the Jews in the kingdom; Queen Esther, however, foiled his design, and Haman was hanged on the very gibbet which he had prepared for Mordecai. See ESTHER, BOOK OF.

HAMANN, hä'mân, JOHANN GEORG (1730-88). A German writer and a very original thinker, sometimes called the 'Magician of the North.' He was born at Königsberg, in Prussia. His early life was somewhat checkered, and he frequently changed his dwelling-place. In 1759 he returned to his home in Königsberg, and devoted himself to the study of the ancient languages and Oriental literature. As an author Hamann was little esteemed by his contemporaries. His language was figurative and symbolical in the highest degree, and frequently concealed rather than revealed the depth of his thinking. Yet he had the friendship of many eminent authors, and the influence which he exercised upon Herder, Goethe, and Jacobi was considerable. All his writings exhibit a deeply spiritual faith in the unseen and the eternal. Among them the *Sokratische Denkwürdigkeiten* (1759) and *Kreuzzüge des Philologen* (1762) are perhaps less oracular than the rest. His complete works were published by Roth (Berlin, 1821-43), in seven volumes; an eighth volume by Wiener (Berlin, 1843) contains additions and explanations and an indispensable index. His correspondence with Jacobi was published by Gildemeister (Gotha, 1868), who also wrote his biography (4 vols., 1857-63). For his life, consult Poel (Hamburg, 1874-76).

HAMASA, or **HAMASAH**, hä-mä'sä (Ar. *hamāsah*, bravery, from *hamisa*, to be firm). The name of a famous anthology of Arabic poetry, collected by Habib ibn Aus et-Tai, surnamed Abu Temmam (c.807-846), and divided by him into ten books. The first book is the longest, and deals with the heroes of pre-Islamic times, illustrating the quality of hamasah (valor), which names the book, and also the whole collection. The remaining books deal with (2) Lamentations; (3) Manners; (4) Love; (5) Satires; (6) Hospitality; (7) Descriptions; (8) Travel; (9) Pleasantries; (10) Blame of Women. The collection is made with singularly good taste, and is taken from extempore works rather than from the standard poets. It is of great historical value, since it pictures very faithfully the life and the characteristics of the early Islamic era. There are three editions of the Arabic (1) by Freytag (2 vols., Bonn, 1828-47); (2) the Bulak edition (A. H. 1256); (3) the Calcutta edition (1856). The Hamasah has been translated into German by Friedrich Rückert (Stuttgart, 1846), and selections have been rendered into English by Lyall, *Ancient Arabic Poetry* (London, 1885). See ABU TEMMAM.

HAMATH, hä'mäth. A city in Northern Syria, situated on the banks of the Orontes (the modern el-Asi). The name signifies 'fortress' or 'sacred inclosure;' by the Greeks the city was called Epiphania, by the Christians Emath Epiphania; but the old name still maintains itself as Hama. Hamath is mentioned as early as the inscriptions of Thothmes III. (B.C. 1503-1449), and Seti I. (B.C. 1356-1347). King Tou (or Toi), of Hamath, sent to David a message of congratulation upon his victory over Rehob (after B.C. 1026; II. Sam. viii. 9). Hamath was evidently the capital of a State whose boundaries extended to the northern limits of Israel, 'the entrance of Hamath,' which probably was the opening between the Nasairiyeh Mountains above Tripoli and the north point of Lebanon. It is doubtful whether Solomon exercised any authority north of this point. Irchuleni of Hamath was one of the allied kings against whom Shalmanezer II. fought at Karkar in B.C. 854. In II. Kings xiv. 28, the text is too corrupt to permit any conclusion as to the author's thought, and the passage cannot be used to prove a conquest of Hamath by Jeroboam II. of Israel. Ini-ilu of Hamath paid tribute to Tiglath-pileser III. in B.C. 730, who annexed 19 districts of the land to Assyria. Sargon conquered Hamath in B.C. 720 and flayed King Ilu-bidi alive. According to II. Kings xvii. 24-30, Hamathites were transported to Samaria; a confusion with some other name is probable. Hamath belonged successively to the Assyrian, the Chaldean, the Persian, and the

Seleucid kingdoms. In the Asmonean period Jonathan, the Judean high priest, marched with an army into the country of Hamath for the defense of Demetrius. Hamath submitted peaceably to Abu Ubaida, the Moslem leader, in 639, and the Christian church was changed into a mosque. In the period of the Crusades the Ismailians took possession of Hamath. Tancred conquered the city in 1108 and massacred the Ismailians; but the Christians lost it to the Turk Togtekin in 1115. In 1178 the city passed into the hands of Saladin. A flourishing period for Hamath was the reign of Abulfeda (1310-31). In 1812 Burckhardt visited the city and saw the famous stones covered with Hittite inscriptions, which have not yet been deciphered. (See HITTITES.) For the modern town see HAMA. Consult: Burckhardt, *Travels in Syria and the Holy Land* (London, 1822); Delitzsch, *Wo lag das Paradies?* (Leipzig, 1881); Winckler, *Alttestamentliche Untersuchungen* (Leipzig, 1892); Ed. Meyer, *Geschichte des Alterthums*, vol. i. (Stuttgart, 1884).

HAMBACH, häm'bäg. A village of Bavaria, situated in the Rhine Palatinate, 15 miles west of Speier. Population, in 1900, 2244. It has an old castle, and is famous chiefly on account of the Hambacher Fest, a revolutionary meeting which took place here on May 27, 1832, attended by about 30,000 persons. This gathering marked the beginning of an open republican movement in Germany, and was followed by a series of reactionary measures on the part of the Bavarian Government. Most of the leaders of the gathering were compelled to seek safety abroad, and some were imprisoned. The fortieth anniversary of the Hambacher Fest was celebrated on May 27, 1872, with the approval of the Bavarian King.

HAM-BEETLE. A cosmopolitan beetle (*Necrobia rufipes*) of the family Cleridæ, also called 'red-legged ham-beetle,' which is particularly abundant in the Southern and Western United States, and occasionally ruins many hams in the packing houses and storehouses. The injury is generally due to careless packing or to the accidental cutting or cracking, or even to a considerable stretching or fraying of the canvas covering of the hams. It is a small, rather slender beetle of dark-bluish color, with reddish legs. Its larva is a slender grub, white at first, with a dark head and two small hooks at the end of the body. When full-grown it is grayish-white with a series of brown patches above. It transforms to pupa within a paper-like cocoon. There are several generations each year, and the winter is passed both in the larval stage and as an adult.

HAM'BLET, PRINCE OF DENMARKE, HYSTORIE OF. The probable source of Shakespeare's *Hamlet*, an English translation of one of Belleforest's *Histoires tragiques*, which, in their turn, were copied from Bandello's tales. The French version was published in 1570, and was at once extremely popular in England; the translation was made before 1596, possibly by 1589. See AMLETH.

HAM'BLIN, JOSEPH ELDRIDGE (1828-70). An American soldier of the Civil War, born at Yarmouth, Mass. Long a member of the Seventh Regiment of the New York militia, he enlisted in 1861 as adjutant in Duryea's Zouaves, and served in Virginia under Butler, McClellan, Meade, Grant, and Sheridan in the Sixty-fifth New York. He especially distinguished himself at Cedar Creek, where he was wounded. He was brevetted brigadier-general, and in 1865 promoted to full rank, with the brevet of major-general, for his gallantry at Sailor's Creek. After the war he was prominent in the New York National Guard.

HAMBLIN, THOMAS SOWERBY (1800-53). An American actor, born in Pentonville, near London. As a member of the Sadler's Wells Theatre Company he won some success in London, especially at Drury Lane (1820); but gained much more in New York City, whither he came (1825) with his wife, Elizabeth Blanchard. In 1830, after extended American tours, he and James H. Hackett leased the Bowery Theatre in New York City, and soon after gained entire control of it. He lost heavily when this theatre was burned (1836); was not very successful in an English tour; and later became manager of the second and of the third Bowery Theatre. The Park Theatre was burned during the first year of his management (1848). 'Handsome Tom Hamblin' was an excellent actor, though somewhat uneven; a liberal manager; an excellent business man; and a great favorite with the public. Hamblin's principal rôles were Hamlet, Macbeth, Othello, Rollo, and Pierre.

HAMBURG, häm'boorK. A city-State and a city of the German Empire, with a gross area of 159 square miles, of which the city occupies 30 square miles (Map: Germany, D 2). The city-State embraces, in addition to the city, four contiguous districts, one of which belongs also to Lübeck. It lies mostly in one body, around the city itself, on the north side of the Elbe, at the head of the river's estuary-like mouth. It is bordered by Schleswig-Holstein on the north and Hanover on the south. The city-State comprises also small scattered districts, including Ritzebüttel (with Cuxhaven) and the island of Neuwerk, both at the mouth of the Elbe. Nearly one-half of the total area is in farms and gardens, and a rather large percentage is in meadow. Grain, vegetables, and hay are the chief crops. The fruit output is considerable, and is excellent. The live-stock holdings are heavy.

The city of Hamburg is situated on the north bank of the Elbe, at the mouth of the Alster, in latitude 53° 33′ N. and longitude 9° 59′ E., and with its suburbs extends for over 5 miles along the river-front; it is the largest port on the Continent of Europe, and the third largest in the world. Its climate is damp, mild in winter and cool in the summer. The mean annual temperature is over 46° F.; rainfall, 28 inches. The city consists of two radically different parts. The central part—since the disastrous fire of 1842 reconstructed according to modern ideas—by its broad, well-lighted, well-drained streets, and fine, lofty houses, offers a striking contrast to the remaining part, much of which is devoted to wholesale business, and is intersected by canals, along which goods are conveyed in lighters to and from the warehouses. The ancient ramparts, converted into gardens and walks, now constitute an inner park-like girdle, separating the old city from the adjacent suburbs of St. Pauli, Altona (q.v.), Ottensen, Rotherbaum, St. Georg, Borgfelde,

Hohenfelde, and Uhlenhorst. In most of these suburbs attractive villas may be found. The beauty of the city is greatly enhanced by two large sheets of water formed by the Alster, and known as the Binnen-Alster, or Alsterbassin, and Aussen-Alster. They are surrounded by good hotels, handsome private houses, and fashionable promenades. Two splendid bridges span the Elbe, over sixty bridges span the canals in the city, and there are numerous steam ferries. The harbor, with its vast traffic, is one of the sights of the city, and splendid views of it are to be had from different elevations. Of the several fine public buildings, the most noteworthy are the Exchange, containing a commercial library, with over 100,000 volumes; the Rathaus, an elaborate structure in Roman Renaissance, completed in 1897; the Seewarte (the buildings of the German Meteorological Station); and the Deutsches Schauspielhaus, completed in 1900. The principal churches are: Saint Nicholas, built from designs by Sir Gilbert Scott, at a cost of $1,000,000, as a memorial of the fire of 1842, a fine Gothic building, with one of the loftiest spires in Europe (485 feet high); Saint Michael's, built in the eighteenth century, in the Renaissance style, and also distinguished by a lofty spire (426 feet high); and Saint Catharine's, dating from the fifteenth century, and archæologically interesting, being one of the few churches that escaped the fire.

Among the streets of Hamburg the Jungfernstieg is the most famous and the busiest thoroughfare. The Alter Jungfernstieg and the Neuer Jungfernstieg are handsome quays, which bound the Alsterbassin. The Neurwall and the Alterwall, near the Exchange, are the centre of commercial life, and the Rödings-Markt and the Katharinenstrasse contain fine residences of merchants of the seventeenth and eighteenth centuries. Of the new streets, the Kaiser-Wilhelm-Strasse, opened in 1892, is the most important. The Anlagen are a fine public promenade, laid out on the site of the old fortifications, and the Sandthor-Quai and the Kaiser-Quai, where the large steamships lie, are the most prominent quays along the Elbe. Hamburg is not rich in public monuments. The statue of Lessing, by Schaper, the monument to the sons of Hamburg who fell in the war of 1870-71, by Schilling, and the Hansa fountain, deserve mention.

Situated on a low plain, far from any mountains, the city derives its drinking-water from the Elbe. Formerly this was so polluted that Hamburg suffered from cholera epidemics more than any other city in Northern Europe; but since 1893, when a newly devised and enormous filtering plant was put into operation, there has been no recurrence of the epidemic. A well-constructed sewerage system drains the city perfectly, discharging the refuse into one sewer tunnel which empties into the river with the outgoing tide, and is automatically dammed by the incoming tide. Garbage is burned in municipal crematories erected in 1893. The streets are well paved with asphalt or smooth square stones, and are kept very clean, the principal ones being washed and swept every day, and the less frequented ones cleaned a few times a week. The struggle against cholera epidemics led the city authorities to revise also the building regulations. This was necessitated by the fact that the poorer classes of the population are housed in the mediæval portion of the town, in crowded houses facing narrow streets and small, poorly ventilated courts; a considerable part of them (6½ per cent. in 1890) lived in cellars. The new rules require more sanitary arrangements, and, in case of cellars, more light and better safeguards against dampness.

Hamburg has a large number of hospitals, the most noteworthy being the Epidemic Hospital, opened in 1894, and considered one of the best in the world. Connected with the hospitals are stations equipped with large ovens for disinfection by heat of all kinds of household goods. Food inspection is in charge of the Hygienic Institute, where a thoroughly equipped bacteriological laboratory is maintained. A special sanitary service is maintained in the harbor, to see that all the sanitary regulations are complied with on incoming ships. Municipal baths and washhouses were established in 1855. The establishments are built and run after the British model. (See LIVERPOOL; GLASGOW; MANCHESTER; etc.) The effect of all these measures is seen in the diminished death-rate, which declined from 30 per 1000 in 1865 to less than 20 in 1895 and about 17 in 1900. Hamburg owns both its gasworks and electric plant; but they are operated by a private company paying the city a high rental, and rendering excellent service under the strict supervision of the city authorities. The street cars are also in the hands of private companies, who pay the city a tax of one pfennig per passenger, in addition to all ordinary taxes levied by the city, besides keeping the streets in repair within the limits of one or two feet on either side of the tracks. At the expiration of the charter the property of the company reverts to the city. Electricity is supplanting the use of horse-power on most of the lines. There is also a line operated by steam, belonging to the Prussian Government, and connecting the various railway depots in the city. The fares range from 2½ cents upward, according to class and distance. The charitable institutions are numerous and well endowed. For the purposes of poor relief, the city is divided into nine districts, which are in turn subdivided into some 1600 smaller districts. The work of relief is administered by a charity board, composed of three Senators and fifteen members of the Lower House, elected for five-year terms. The amount spent for relief was 2,820,000 marks in 1884, 5,023,000 marks in 1893, and 6,538,000 marks in 1899. There are also a great many private societies and asylums for the relief or reception of needy persons. Besides the hospitals mentioned above, there are two general hospitals, a seamen's hospital, an establishment for the insane, with an agricultural colony at Langenhorn (1893), and other special institutions.

There are several large and excellent private schools, over 160 public schools, a school of art, and conservatory of music, in addition to the Johanneum, a public grammar school, founded in 1528. The city also maintains a correctional school (Strafschule), to which children may be sent for periods of from eight days to eight weeks, an orphan school, a school for deaf and dumb, and one for the blind. There are, besides, schools for technical instruction, building construction, machine-building, navigation, and phar-

macy. The public library contains over 600,000 volumes and 5000 manuscripts. The Kunsthalle, or public art gallery, is an important edifice in early Italian Renaissance. Its collection of paintings is extensive but third-rate. The Natural History Museum is excellent, as is also the Industrial Art Museum. An observatory, botanical museum and gardens, a fine zoölogical museum, and State laboratory, are among many other institutions of a scientific or educational nature; there are also several theatres and a great number of public gardens and places of amusement. The first German theatre for opera was established in Hamburg in 1678.

The geographical situation of Hamburg makes it the commercial emporium of Northern Europe. Through the Elbe, with its numerous branches and canals, ships leaving Hamburg can reach the heart of Germany; it is also the terminus of seven lines of railway, which furnish direct communication with all the German cities. In 1888 Hamburg became a member of the German Customs Union. This stimulated its trade still further, and about 1890 new docks were constructed at Cuxhaven for ocean steamers, involving an expenditure of $40,000,000. The dock and harbor facilities are the most complete in the world; vessels drawing 23 feet can go up the harbor at high tide. The number and tonnage of vessels entering the port in the last years of the last three decades of the nineteenth century were as follows: 1880, about 6000 ships, of 2,800,000 tons; 1890, about 8000 ships, of over 5,000,000 tons; 1900, 13,100 ships, of 8,000,000 tons. The number of vessels and the tonnage of the mercantile navy of Hamburg surpass that of Holland. In 1880 Hamburg had 475 ships, of 230,000 tons; in 1890, 587 ships, of 538,000 tons; in 1900, 792 ships, of 993,000 tons. In 1900 the imports of Hamburg by sea, river, and land were valued at about $951,000,000; the exports, $285,000,000. The leading nations in respect to the amount of exports and imports are Great Britain and the United States. In 1893 the imports from Great Britain amounted to $93,762,766, the exports to $93,137,778. In the same year imports to the value of $42,047,698 came from the United States, and the exports were $39,410,896. But in 1900 the United States outstripped Great Britain in imports, the respective figures being $114,954,000 and $108,052,000. In the amount of exports the figures were $103,530,000 for Great Britain and $52,598,000 for the United States. The chief articles of import and export are foodstuffs and raw materials. Manufactured articles constitute about one-fourth of the total value. Hamburg is one of the largest coffee marts, and in money-exchange transactions is among the foremost cities of the world. It is also one of the principal emigration ports of Germany, 405,998 persons having left during 1891-95, of whom 356,365 were bound for the United States. Among the principal industries are cigar-making, spirit and sugar refining, brewing, meat-curing, machine and ship building, coffee-roasting, chocolate manufacture, flour-milling, manufacture of furniture, pianos, leather, ivory, and celluloid, etc.

The city-State of Hamburg constitutes one of the States of the German Empire. Its official name is the Free and Hansa City of Hamburg (Freie- und Hansa-Stadt Hamburg). Its constitution is democratic. The executive power is vested in a Senate of eighteen members, chosen for life by the two governing bodies. One-half of the Senators must have studied law or finance, and seven of the remaining nine must be members of the merchants' guild. The Senate elects a first and a second burgomaster from its own members, for a term of two years. The legislative power is confined to the House of Burgesses, consisting of 160 members, who are elected for six years, one-half retiring every three years. The Senate, however, has a veto power in all matters except those pertaining to taxation and revenue. In case of a deadlock between the two bodies, the matter is referred to a joint arbitration board, or to the Supreme Court of the German Empire.

The administration of the city-State is divided into several departments, each being presided over by a Senator. The chief departments are:

1. The Board of Health—(Medicinal-Collegium).
2. Board of Public Works—(Bau-Deputation).
3. Police Board—(Polizei Behörde).
4. Board of Charities—(Armen Deputation).
5. Prison Board—(Gefängniss Deputation).
6. Department of Finance—(Finanz-Deputation).
7. Harbor Administration—(Haben Verwaltung).
8. Board of Education—(Oberschulbehörde).

Hamburg is the seat of the upper Hanseatic court and of the three provincial courts of Bremen, Hamburg, and Lübeck. It sends three members to the Imperial Parliament at Berlin.

Hamburg virtually has a municipal fire-insurance institution, making insurance compulsory for every householder; it also subsidizes a private employment bureau, and maintains a municipal pawnshop, established in 1650. The debt is heavy, but is largely offset by productive public property, as, for instance, the harbor and its equipment. The debt has latterly grown rapidly, and amounted to about $105,500,000 at the close of 1900. In 1902 the expenditures amounted to $25,500,000; the revenues, $9,000,000. Of the expenditures $5,000,000 went for public buildings, $5,300,000 for the service of the debt, $4,200,000 for the police department, and $2,750,000 for education. About $600,000 of the revenues is earned by the municipal lottery.

The population of the city has more than doubled within the thirty years 1871-1900, having risen from 339,000 to 706,000. Hamburg is the largest city, according to population, in Germany, next to Berlin. The total population of the city-State in 1900 was 768,349, nearly all Protestants.

Somewhere between 805 and 811 Charlemagne founded the castle of Hamburg as a defense against the heathen Slavs. In 831 an episcopal see was erected there (soon to be united with that of Bremen), and Hamburg became a centre of civilization for Northern Europe. The town was repeatedly burned and plundered by Norsemen, Danes, and Slavs. In 1189 it received important commercial privileges from Frederick Barbarossa. By treaties with Lübeck and Bremen, in 1241 and 1249, it initiated the Hanseatic League (q.v.). From that time it increased rapidly in wealth and commercial importance, augmenting its territory by the purchase of the township of Ritzebüttel, at the mouth of the Elbe (where the harbor of Cuxhaven is now situated), and several villages and islands in the vicinity of the town. Under the protection of the German emperors, Hamburg soon became powerful enough to defend itself and its com-

merce, both by sea and land, and carried on war for a considerable period against the Dutch and the Danes, though with varying success. Maximilian I. declared Hamburg an Imperial city in 1510, though the act was not confirmed by the Imperial Chamber till 1618. In 1529 the city officially adopted the Reformed religion, and the large number of religious refugees from the Iberian Peninsula and Holland enriched it greatly during the sixteenth and seventeenth centuries. After 1750 its commerce developed wonderfully, owing to the American and French revolutions, the wars between England and France, and the downfall of the trade of the Netherlands. Napoleon's Continental system, however, proved fatal to its commerce, especially after 1810, when it was made a part of the French Empire. In 1813-14 the city endured a terrible reign of pillage and oppression at the hands of the French general Davout. By 1814 its population had sunk from 100,000 to 55,000. In 1815 it entered the German Confederation as a free city of the Empire. It thrived exceedingly, in spite of a disastrous fire which swept off a quarter of the city in 1842. After forming part of the North German Confederation, Hamburg became a member of the German Empire in 1871. Jealousy of its commercial privileges kept Hamburg out of the Zollverein till 1888. In 1892 a severe outbreak of cholera killed nearly 9000 of the inhabitants.

BIBLIOGRAPHY. Gallais, *Geschichte der Stadt Hamburg* (3 vols., Hamburg, 1856); Wichmann, *Hamburgische Geschichte in Darstellungen aus alter und neurer Zeit* (Hamburg, 1889); Faulwasser, *Der grosse Brand und der Wiederaufbau von Hamburg* (Hamburg, 1892); "Hamburg as a Market for American Products," *United States Section of Foreign Markets* (Washington, 1897); Shaw, *Municipal Government in Continental Europe* (New York, 1897); Maltbie, *Municipal Functions* (New York, 1898).

HAMBURG. A breed of domestic fowls, noted as economical egg-producers. They are of trim build, resembling Leghorns, and of great beauty of plumage. Six varieties are recognized —the golden spangled, silver spangled, golden penciled, silver penciled, black, and white. The large black 'redcap' and the Dutch 'campine' are also in this class. The designations refer to the markings. The 'spangles' or 'moon eyes' are round or oval spots; the 'pencilings' are bars of reddish bay or black, or of clear silvery white and black. The most popular varieties are the spangled (see Colored Plate of POULTRY), because of their fine form as well as beauty of coloration. Their 'points' are as follows: Comb, square at front, tapering nicely into a long spike, full of points by no means plain, firmly and evenly set on the head; face, red; ear-lobes, moderate size, round as possible, and clear white; legs, leaden blue; carriage, graceful; plumage, very profuse. (Thus far the specifications belong to the whole Hamburg breed.) Silver-spangled cock: Color, clear, silvery-white ground, every feather tipped or spangled, the breast as bold as possible, but showing the spangle, the bars of the wing regular and bold; neck, back, and saddle nicely tipped; bow well marked (by no means cloudy, brown, or brassy); back, as green as possible. Silver-spangled hen: The white clear and silvery, the spangles large, green as possible, distinct and clear. Golden-spangled cock: Ground, rich; clear spangles, large and distinct. Hen: Color, very black and rich ground, the back glossy green; the neck, back, and saddle nicely striped; bow of wing well marked.

HAMDI BEY, häm′dē bā, OSMAN (1842—). A Turkish statesman and scholar, son of Edhem Pasha, born in Constantinople and educated in Paris. He was Governor of Bagdad (1868-70), a delegate to the Vienna Exposition in 1873, General Secretary of Foreign Affairs, then Governor of Pera, in 1882 director of the Imperial museums at Stambul, and (1888) connected with the Department of the National Debt. A painter, with some reputation for his rendering of Oriental interiors, he founded in 1882 a Turkish Ecole des Beaux-Arts, which is not limited in its courses by the provisions of the Koran. He edited with Reinach *La nécropole royale de Sidon* (1892-93), and built at his own expense, near the Tchinili Kiosk, a Greek building, in which the sarcophagi from the Sidon Necropolis might rest.

HAMEL, ȧ′mĕl′, LOUIS ERNEST (1826-98). A French historian and politician, born in Paris. He was educated at the Lycée Henri IV. and in the law school of the University of Paris; but he practiced little, preferring literature and politics. He was a contributor to the liberal sheets; was an editor of *L'homme libre;* was three times defeated as candidate for the National Assembly; but in 1878, 1881, and 1884 was elected to the Parisian municipal council. Besides his earliest work, *Les derniers chants*, a book of verse (1851), his writings are historical: *Histoire de Saint-Just* (1859); *Histoire de Robespierre* (1865-67), in three volumes, of which the publishers refused, for fear of prosecution, to publish the last two volumes until they were compelled to do so at their own risk by legal decision; *Monsieur Michelet, historien* (1869); *Précis de l'histoire de la révolution française* (1870); *Histoire de la république française sous le Directoire et sous le Consulat* (1872); *Histoire des deux conspirations du général Malet* (1873); *Histoire illustrée du second Empire* (1873); *Souvenirs de l'homme libre* (1878); *Histoire du premier Empire* (1882); *Histoire de la Restauration* (1887); *Histoire du règne de Louis Philippe* (1889); *Histoire de la seconde République* (1891); and *Histoire du second Empire* (1893-94).

HAMELIN, häm′e-lĭn, THE PIED PIPER OF. See PIED PIPER OF HAMELIN.

HAMELN, hä′mĕln. The capital of a circle in the Prussian Province of Hanover, situated at the confluence of the Hamel with the Weser, 25 miles southwest of Hanover, with which it is connected by rail (Map: Prussia, C 2). The Weser is crossed by a suspension bridge. The town has an old-fashioned appearance, and contains many specimens of mediæval and Renaissance architecture. It has a 'real' gymnasium. The chief industrial establishments are sugar-refineries, tanneries, distilleries, machine-works, flour-mills, paper-mills, etc. The commerce is quite important, and there is considerable shipping in the harbor. Hameln is noted on account of the legend of the Pied Piper of Hameln (q.v.).

Hameln had its origin in the Abbey of Saint Boniface. It was sold to the Bishop of Minden in 1259, but the transaction did not meet with the approval of the townspeople, who, after

a bloody battle, placed themselves under the protection of Brunswick. The town was a flourishing member of the Hanseatic League. It was taken by the Swedes in 1633, and surrendered to the French in 1757 and in 1803. It finally passed to Prussia in 1866. Population, in 1890, 13,675; in 1900, 18,965.

HAMERIK, hä'me-rīk, ASGER (1843—). A Danish composer. He was born at Copenhagen, and, despite the opposition of his parents, studied music unaided, and when but fifteen years of age had so far succeeded in his ambition as to be able to study openly, under Gade, Matthison-Hansen, and Haberbier. In 1862 he went to Berlin to become a pupil of Von Bülow, and two years later, when studying in Paris, met Berlioz, with whom he visited Vienna (1866-67). His *Hymne de la paix*, written for the Paris Exhibition, earned for him a gold medal, and was greatly esteemed for its splendid orchestration. He wrote several operas, which were produced either in France or Italy, and in 1871 was appointed director of the Peabody Conservatory of Baltimore, and also of the Peabody symphony concerts. In 1890 the King of Denmark conferred upon him the honor of knighthood. Not long afterwards he resigned his post in Baltimore and returned to Europe. Among his more important works are: *Der Wanderer* (1872), a festival cantata; *La Vendetta* (1870), an Italian opera; the choral work *Christliche Trilogie*. The operas *Tovelille* and *Hjalmar and Ingeborg* were only given in part. He also composed much successful chamber music, and was particularly happy in his solo work for the 'cello.

HAMERLING, hä'mēr-ling, ROBERT (1830-89). An Austrian poet, dramatist, and novelist, born March 24, 1830, at Kirchberg am Walde, in Lower Austria. For four years he was a choir-boy at the Cistercian Monastery of Zwetl. Later he went to a gymnasium in Vienna, and afterwards matriculated for the study of medicine. Besides natural science, Hamerling cultivated classical and Oriental languages and also philosophy. In 1855 he became a professor in Triest, but ten years later chronic illness forced him to withdraw. An Imperial decree now granted him a pension, and he was likewise helped out by a Viennese lady. On July 13, 1889, after years of pain, he died in his villa near Gratz. Hamerling's style is rich and highly colored, his ideas are daring and keen. His mastery over his language is notable. Among his many writings some of the most striking are: *Ein Sangesgruss vom Strande der Adria*, poetry (1857); *Sinnen und Minnen*, youthful poems (1859, 1886); *Gesammelte Kleinere Dichtungen* (1871, 1890); *Blätter im Winde* (1887, 1888); the epic *Ahasver in Rom* (1886; 23d ed. 1892), a description of Nero's Rome; *Der König von Sion* (1868, 1890); *Die sieben Todsünden* (1887); *Homunculus* (1880, 1890); *Danton und Robespierre*, a tragedy (1871, 1877); *Aspasia*, a novel of the time of Pericles (1876). Selections from his *Works* appeared in 1901. Consult: Kleinert, *Robert Hamerling, Ein Dichter der Schönheit* (Hamburg, 1889); Polzer, *Robert Hamerling, Sein Wesen und Wirken* (ib., 1890); Rabenlechner, *Hamerling, Sein Leben und Seine Werke* (ib., 1895); id., *Hamerling* (Dresden, 1902).

HAM'ERTON, PHILIP GILBERT (1834-94). An English writer on art, painter, and etcher. He was the son of a solicitor, and was born at Laneside, near Shaw, Lancashire. His mother died when he was an infant, and his father, who was an inebriate, died ten years later. For these and other reasons Hamerton's boyhood was lonely. He gave up in displeasure his preparation for Oxford, turned to poetry and art, and began writing for the reviews. He traveled in Wales, visited France, and in 1857 began his periodic encampments on an island in Loch Awe in the Scotch Highlands, described in *A Painter's Camp in the Highlands and Thoughts About Art* (1862). This notable work was followed by the more technical *Etching and Etchers* (1868); *Contemporary French Painters* (1868); and *Painting in France After the Decline of Classicism* (1869). In 1869 he founded the *Portfolio*, an excellent art magazine, which he edited till his death. Among his other numerous writings are: *The Intellectual Life* (1873); *Life of Turner* (1879); *The Graphic Arts* (1882); *Human Intercourse* (1884); *Landscape* (1885); and *French and English* (1889). Hamerton, who had married a French woman, passed his latter years in France, and died at Boulogne-sur-Seine. Like Ruskin, Hamerton was an art interpreter to his generation, the medium between the artist and the public. For this he was eminently suited because of the catholicity of his taste, and his agreeable style. Consult *Philip Gilbert Hamerton: An Autobiography and a Memoir by His Wife* (London, 1896).

HAMI, hä'mē, or **KOMUL,** kō'mul. A small town of Chinese Turkestan, situated in a fertile district 30 miles south of the eastern end of the Tian-Shan or 'Celestial Mountains,' near the northern verge of the desert of Gobi, about 60 miles southeast of Barkul. Its elevation above the sea is about 3000 feet. The oasis of Hami, which has an area of between 80 and 100 square miles, produces wheat, barley, maize, millet, pumpkins, watermelons, and excellent grapes. The poppy is also grown. The 'town' consists of an old town (Lao-ch'êng), built about two centuries ago, and a new town (Sin [or Hsin] Ch'êng), surrounded with moated walls, 20 feet in height, pierced with four gates, each surmounted with a tower in true Chinese style. The Mohammedan quarter, built over 300 years ago and called Khamil, is about a mile off. It is surrounded by a mud wall, and contains some 250 to 300 families. Here the kings of Hami lie in a mausoleum, the dome of which is covered with green-colored tiles. The population of the old town is said to be about 5000. Hami is advantageously situated as a trade centre, as here the great travel-route from east to west forks into two branches—one, the Tian-Shan Nan-lu, running along the south side of the Celestial Mountains to Kashgar and Yarkand; and the other, the Tian-Shan Peh-lu, proceeding by an easy pass 9000 feet high over the mountains along their northern foot to Kulja and beyond.

HAMIL'CAR (Phœnician, grace of Melkart, Gk. Ἀμίλκας, *Amilkas*). A name borne by several distinguished Carthaginians, the most celebrated of whom were: (1) The commander of the great Sicilian expedition, B.C. 480. (2) One of the commanders of a Carthaginian army defeated by Timoleon, the Corinthian general, at the Crimissus, B.C. 339. (3) (Surnamed Rhodanus) the ambassador to Alexander the Great after the fall

of Tyre (B.C. 332). (4) Governor of Sicily, B.C. 317. (5) The son of Gisco, who succeeded the preceding, and carried on military operations against the Syracusans and other States with great success, but was at length taken prisoner and put to death (B.C. 309). (6) A commander during the First Punic War, who was very successful against the Romans by land in Sicily, but was afterwards defeated in a sea fight off Ecnomus, and was thereafter recalled to Africa to oppose Regulus.

The greatest of all was Hamilcar, surnamed Barca or *Barak*, 'lightning.' While very young he was appointed to the command of the Carthaginian forces in Sicily, in B.C. 247, at which time the Romans had possession of almost all the island. Hamilcar's first care was to discipline his infantry thoroughly; he then established himself on Mount Hercte, and from this point made pillaging excursions in all directions, sending his privateers along the coast of Italy as far north as Cumæ, thus obtaining abundant supplies for his troops. From this position the Romans endeavored to dislodge him, but in vain. After three years he left Hercte, and established himself on Mount Eryx, keeping up his communication with Drepanum and the sea, where the same tactics were repeated on both sides, and with the same want of success on the part of the Romans. The Carthaginian admiral, Hanno, having been totally defeated off the Ægates Islands, B.C. 241, Hamilcar was compelled to evacuate his fortress and abandon Sicily. While Hamilcar was engaged in Sicily he had made large promises to his mercenary troops which he was unable to fulfill; they revolted in consequence, and were joined by some of the African tribes. Hanno endeavored to suppress the revolt, but failed; Hamilcar was accordingly appointed to the command, and succeeded in utterly defeating the rebels, capturing all their towns and putting to death their leaders. Hamilcar was next appointed commander-in-chief of the Carthaginian Army, and was engaged for some time in wars with the neighboring tribes, which were abruptly ended by Hamilcar's entering upon his Spanish campaign about B.C. 236. His great aim was to found a new empire in Spain, from which, as his basis, he might assail the Romans. Such a kingdom he saw would increase the power and wealth of his native country, and atone to her for the loss of Sicily and Sardinia. This end he did not himself accomplish, but he prepared the way for its accomplishment by Hasdrubal and Hannibal. He marched westward, while the fleet under his son-in-law, Hasdrubal, cruised along the coast; he then crossed over the Strait of Gibraltar, and made war on the natives of Spain, in the course of which he penetrated to the very heart of the country, subdued many tribes and cities, and amassed immense wealth. He spent nine years in Spain, and at length, in B.C. 228, met his death on the field of battle while fighting against the Vettones. His military genius is considered scarcely inferior to that of his son Hannibal.

HAM'ILTON. The capital of Dundas and Normanby counties, in the western district of Victoria, Australia, on Grange Burn Creek, 50 miles northeast of Portland, and 198 miles west of Melbourne, with which it has railway connection. It is a pastoral, agricultural, and stock-raising centre, with important semi-annual exhibitions and race meetings. Population, in 1901, 4026.

HAMILTON. The capital of the Bermudas (q.v.), situated on Hamilton Island. Population, in 1901, 2246.

HAMILTON. The capital of Wentworth County, Ontario, Can., and port of entry on Burlington Bay, at the southwestern extremity of Lake Ontario, on the main line and several branches of the Grand Trunk Railway, 70 miles northwest of Buffalo, N. Y. (Map: Ontario, D 4). The port is reached by a canal dug through a sandbar which, stretching across the bay for five miles, serves as a breakwater for a fine harbor. Desjardins Canal, four miles long, connects the harbor with Dundas. There is daily steam communication with other lake ports, and an extensive trade with the Maritime Provinces. Hamilton is the centre of Western Canada's fruit district. The output of its numerous industries comprises iron wares, sewing-machines, agricultural implements, glass, cotton, woolen, and tobacco products, musical instruments, and other manufactures. It is the fifth city of importance in the Dominion, and is frequently styled the Canadian Birmingham. The United States is represented by a consul. The city sends two representatives to the Dominion House of Commons, and two to the Provincial Legislature; it is the seat of Anglican and Roman Catholic bishops. The town, laid out in 1813, is built on a plateau, has wide streets, market and county-house squares, and many elegant residences on the rising ground which culminates in 'the mountain,' 250 feet high, with its inclined railway. At the summit of 'the Mountain' is the Government Lunatic Asylum. Other features include the post-office, custom-house, city hall, public library, and Dundurn Park. The race-course at Hamilton is one of the finest in America. The sandbar, known as Burlington Beach, is a popular summer resort, with a good hotel. Population, in 1891, 48,980; in 1901, 52,550.

HAMILTON. A market town and municipal borough in Lanarkshire, Scotland, on the left bank of the Clyde, 11 miles southeast of Glasgow (Map: Scotland, D 4). The inhabitants are chiefly employed in neighboring coal and iron mines, and limestone quarries; market-gardening and muslin-weaving are minor industries. The town is irregularly built on rising ground, commanding fine views. Its prominent structures are the burgh buildings with a clock tower 130 feet high, the county buildings, in the Grecian style, and the cavalry barracks. The town owns its gas and water-works. It gives the title to the first peer of Scotland, the Duke of Hamilton and Brandon, whose famous family seat, Hamilton Place, in the midst of extensive pleasure grounds, is adjacent to the demesne of Cadzow Castle with the remains of its forest, where primeval oaks and a herd of the original breed of wild cattle are preserved. Population, in 1891, 24,859; in 1901, 32,775. Consult Grant, *The Commissariat Record of Hamilton* (Edinburgh, 1898).

HAMILTON. A village in Madison County, N. Y., 28 miles southwest of Utica; on the New York, Ontario and Western Railroad (Map: New York, E 3). It is the seat of Colgate University (q.v.) with the Hamilton Theological Seminary

(Baptist). Lumber-yards and a canning factory represent the leading industries. The water-works and electric-light plant are owned and operated by the municipality. Population, in 1890, 1744; in 1900, 1627.

HAMILTON. A city and the county-seat of Butler County, Ohio, 25 miles north of Cincinnati; on the Great Miami River, the Miami and Erie Canal, and the Cincinnati, Hamilton and Dayton, the Pittsburg, Cincinnati, Chicago and Saint Louis, and other railroads (Map: Ohio, B 7). The splendid water-power derived from both the river and canal has materially aided the city's development as a manufacturing centre; its industrial establishments include breweries, paper, flour, and woolen mills, iron-foundries, machine-shops, and safe, agricultural implement, and tool works. The first settlement here was made in 1791, when Gen. Arthur Saint Clair built a fort and called it Fort Hamilton in honor of Alexander Hamilton. Hamilton was first incorporated in 1810. The city is governed under a charter of 1898, by a mayor, chosen every three years, and a board of control, consisting of five members, elected at large. This board, superseding the old city council, has been subdivided, each member being the head of a department. The members in the first instance were appointed by the Common Pleas Judge for terms ranging from one to five years; subsequently they were elected for a period of five years. The water-works, gas plant, and electric-light plant are all owned and operated by the city. Population, in 1890, 17,565; in 1900, 23,914.

HAMILTON. A famous noble Scotch family of English origin. The name, obviously territorial, was doubtless taken from some one of the many English manors called Hamilton, scattered through Buckinghamshire, Hampshire, Surrey, Lancashire, Rutlandshire, Yorkshire, and Leicestershire. The pedigree of the family is traced to 'Walter Fitz-Gilbert (or Gilbertson) of Hamilton,' who, in 1296, held lands in Lanarkshire, and swore fealty to King Edward I. of England as overlord of Scotland, and in 1314 kept the Castle of Bothwell, on the Clyde, for the English. His early surrender of this strong fortress, and of the English knights and nobles who had fled to it from the field of Bannockburn, was rewarded by King Robert Bruce by grants of the lands and baronies of Cadzow and Machanshire in Clydesdale, Kinneil and Larbert in West Lothian, Kirkinner and Kirkowen in Galloway, and other lands forfeited by the Comyns and other adherents of England. He attained the rank of knighthood, and married Mary, daughter of Sir Adam of Gordon of Huntly, by whom he left two sons. To a long list of illustrious descendants accrued the titles, emoluments, and territories comprised in the lordships of Abercorn, Bargeny, Belhaven and Stentoun, Hamilton, Pisley, and Strabane; in the viscountships of Boyne, Clanboy, Hamilton, and Strabane; in the earldoms of Arran, Abercorn, Clanbrassil, Haddington, Orkney, Ruglen, and Selkirk; in the marquisates of Abercorn and Hamilton; and in the dukedoms of Abercorn, Brandon, Chatelherault, and Hamilton. The present leading representatives are Alfred, thirteenth Duke of Hamilton and Brandon, surname Douglas-Hamilton, premier peer of Scotland and hereditary keeper of Holyrood Palace, and James, second Duke of Abercorn, surname Hamilton, Groom of the Stole. Consult: Anderson, *Historical and Genealogical Memoirs of the House of Hamilton* (London, 1823); Fraser, *History of the Earls of Haddington* (Edinburgh, 1889).

HAMILTON, Alexander (1757-1804). An eminent American statesman. He was born at Charles Town, in the island of Nevis, West Indies, on January 11, 1757, and appears to have been the natural son of a Scotch trader named James Hamilton, who died on the island of Saint Vincent about 1799, and Rachel Levine, originally named Faucette, and of French-Huguenot descent, who some time previously had separated from her husband. After a brief period of schooling, the future statesman at the age of twelve—his mother having died in the previous year—was placed in a counting-house at Christiansted, on the island of Saint-Croix; but having shown signs of literary ability, especially in a pamphlet describing a West Indian hurricane, he was sent to the English colonies on the continent when sixteen years of age, for the purpose of continuing his education. Arriving in Boston in October, 1772, he proceeded at once to New York, studied for a year in a grammar school at Elizabethtown, N. J., and then entered King's College (now Columbia University). He soon became intensely interested in the controversy then raging between the Colonies and the British Government, and partly as a result of a visit to Boston during the tension consequent upon the passage of the Boston Port Bill (q.v.), became firmly attached to the patriot cause. On July 6, 1774, he attended in New York a great meeting in the 'fields' (now City Hall Park) assembled to take action on the calling of a general congress, and made, extemporaneously, an impassioned but well-reasoned speech, which brought him to the notice of men of prominence and of the people generally. Soon afterwards he published anonymously two remarkable pamphlets—*A Full Vindication of the Measures of Congress from the Calumnies of Their Enemies* (1774) and *The Farmer Refuted* (1775)—in answer to those of a 'Westchester Farmer,' then much read, and in them endeavored to prove that the Colonies owed allegiance directly to the British Crown, were therefore not amenable to Parliament, and were justified in resorting to extreme measures to vindicate their rights. The pamphlets were at first variously attributed to such men as Jay and Livingston, and, their authorship finally becoming known, they added greatly to Hamilton's growing reputation. In 1775 he twice took a stand, as an advocate of order, against mobs bent on chastising Loyalists. Meanwhile, perceiving that an outbreak of hostilities was imminent, he had devoted himself to the study of military science, and, after serving for a time in a volunteer corps, he was appointed on March 14, 1776, to the command of an artillery company, which soon became so conspicuous for the excellence of its drill that Nathanael Greene, under whose notice it fell, introduced Hamilton to General Washington with a recommendation for advancement. During the retreat after the battle of Long Island, Hamilton distinguished himself by the coolness and courage with which he brought up the rear. He also attracted attention by the skillful manner in which he served his battery at White Plains; participated in the retreat through

New Jersey, and in the battles of Trenton and Princeton; and on March 1, 1777, became an aide on the staff of General Washington, with the rank of lieutenant-colonel. In this capacity he acted as Washington's confidential secretary, attending to much of the correspondence from headquarters; and in November, 1777, was sent on a delicate mission to Albany for the purpose of securing reinforcements from General Gates and General Putnam.

In December, 1780, he married Miss Elizabeth Schuyler, the daughter of Gen. Philip Schuyler, thus allying himself with one of the most influential families in New York. In February, 1781, in a fit of resentment, he left the staff of the commander-in-chief because the latter had rebuked him, on the ground of disrespect, for a delay in obeying orders; and, returning to the line, he successfully led one of the attacking columns at Yorktown (q.v.).

Soon after the outbreak of the war he had begun to take a lively interest in the financial and administrative problems that confronted the Confederation, and in 1780 and 1781 wrote able letters to Duane and Morris, respectively, pointing out the defects in the Articles of Confederation, and the necessity of a strong central Government, and proposing an elaborate scheme for the reorganization of the finances, and the establishment of a bank. From May to November, 1782, he acted as receiver of Continental taxes in the State of New York; and was a member of the Continental Congress in 1782-83, during which time he took a conspicuous part in all debates concerning taxation and finances generally; served on various important committees; proposed an elaborate plan for a military establishment in time of peace; and became convinced, even more strongly than before, of the weakness of the existing Government and the need for complete reorganization. Early in the summer of 1782, after a brief course of study, he had been admitted to the bar at Albany, and upon leaving Congress he took up with assiduity the practice of his profession in New York, meeting with immediate success. He attracted particular attention by his advocacy of the liberal treatment of Loyalists, and in the celebrated case of Rutgers *vs.* Waddington braved popular opinion by attacking the 'Trespass Act' of New York, which provided that a Whig dispossessed by the British could collect rent from those who had occupied his property during his absence. Besides practicing his profession, he took part in the discussion of public measures, was one of the founders of a State bank, and was active in the organization of the Society of the Cincinnati. During the most critical period of national history he vigorously aided the movement for a stronger central Government. He, with Egbert Benson, represented New York in the Annapolis Convention of 1786 (q.v.), and it was he who drafted the report which led to the assembling of the Constitutional Convention at Philadelphia in the following year. Upon his return from Annapolis he was elected to the State Legislature, and was there instrumental in securing the appointment of delegates from New York to the approaching convention, he himself being chosen, along with Robert Yates and John Lansing. Though his influence in the convention was to a great extent nullified by the opposition of his strongly Anti-Federalist associates, who finally withdrew altogether, as did Hamilton for a time, he exerted himself, while in attendance, to impress upon the delegates the need of a thorough reorganization of the Government, and in June, 1787, made an elaborate speech in which he expressed a warm admiration of the British Constitution, and proposed a plan which provided for a strong and virtually independent Executive, and the subordination of the individual States to the Central Government—the Executive and Senators to hold office during good behavior, the State Governors to be appointed by the Central Government, and to have a veto on all State legislation, and the Lower House of Congress to be elected directly by the people. He vigorously supported the Constitution as finally adopted, especially by his production, with Madison and Jay, of the *Federalist* (q.v.) which exerted a powerful influence, and remains the best contemporary exposition of that document; and in the New York convention achieved a remarkable triumph by securing ratification in face of an Anti-Federalist majority at the outset of 65 to 19, making numerous speeches and finally winning over Melanchthon Smith, himself, who had led the debate on the opposing side.

In September, 1789, six months after the organization of the General Government under the new Constitution, Congress passed an act establishing a Treasury Department, and President Washington immediately selected Hamilton as first Secretary of the Treasury. In the then unsettled state of the country financially and economically, this was a position of primary importance, and during his term of office Hamilton rendered to the nation services scarcely less invaluable than those of Washington himself. With tireless energy and remarkable ability he applied himself to the various economic problems which then pressed so insistently for solution, and in report after report laid down policies, which, adopted by Congress, reëstablished the public credit, brought prestige to the National Government in spite of the disintegrating tendencies of the time, and formed precedents which for the most part have since been followed, and have thus in some lines determined the whole subsequent history of the nation. His reports dealt, among other things, with the public credit, the raising and collection of the revenue, estimates of income and expenditures, the temporary regulation of the currency, navigation laws, and the coasting trade, the organization of the post-office, the management of the public lands, the purchase of West Point by the National Government, the establishment of a mint, the founding of a national bank, the policy of the Government with regard to manufactures, and the adoption of an excise; and, in addition, when, at the close of 1791, his administration was attacked as corrupt by the opposition under the lead of Madison and Giles, he sent into Congress a succession of detailed reports, setting forth the operations of his department with such comprehensiveness and lucidity as to turn abuse into praise, and utterly to refute the charges of his assailants. His proposals that the National Government should assume the Revolutionary debts of the individual States, that Congress should establish a national bank by virtue of the 'implied powers' granted by the Constitution—the first suggestion of this doctrine—and that Congress should impose an excise—all of which had in view the strengthen-

ing of the Central Government—precipitated successive controversies in which those who favored Hamilton were uniformly successful, though party lines were sharply drawn, and a powerful opposition, strenuously antagonistic to centralization, was created, under the leadership of Hamilton's great rival, Thomas Jefferson (q.v.). Out of these controversies grew the Federalist and Republican (later Democratic or Democratic-Republican) parties. Hamilton also took an active interest in foreign affairs, and, during the Revolutionary turmoil in Europe and the wars between France and England, uniformly advocated a policy of strict neutrality on the part of the American Government; while by his attitude toward Genet (q.v.) and his well-known views concerning the excesses of the French Revolution, as well as by his freely expressed admiration of the British Constitution, he gave color to the charge frequently brought against him by his opponents, that he was the leader of a strongly pro-English and anti-French faction. At the time of the Whisky Insurrection (q.v.), he advocated the adoption of a vigorous repressive policy on the part of the National Government, and accompanied in person the troops which were sent against the insurgents. On January 31, 1795, he resigned from the Cabinet to resume the practice of his profession in New York City, but kept in close touch with political affairs, continued to be consulted by Washington, and maintained unimpaired his commanding influence in the Federalist Party. He vigorously upheld the Jay treaty (q.v.), in support of which he wrote a series of powerful articles, under the signature "Camillus;" assisted Washington materially in the preparation of his Farewell Address; opposed the first drafts of the Alien and Sedition Acts (q.v.); and strongly combated the doctrines of the Virginia and Kentucky Resolutions (q.v.). A coolness which had appeared in the relations between Hamilton and John Adams (q.v.) as early as 1788, owing to the former having exerted his influence to prevent an equal vote being cast for Washington and Adams, gradually became pronounced, and was especially marked after the election of the latter to the Presidency, when Hamilton, though holding no office, exerted perhaps as much influence over the members of the Cabinet as did the President himself. Hamilton, moreover, strongly disapproved of the mildness and apparent indecision of President Adams's policy toward France. (See X Y Z CORRESPONDENCE.) At Washington's request, however, he was placed in 1798 at the virtual head of the army when hostilities with France appeared imminent, and while acting in this capacity, with the rank of major-general and the position of inspector-general (from July 19, 1798, to June 15, 1800) he devoted himself with energy and ability to the task of organization and preparation, effecting various much-needed reforms, and perfecting plans for the invasion of Louisiana and the Floridas. In the Presidential election of 1800 Hamilton showed a preference for Pinckney over Adams for the Presidency, and by publishing an ill-advised pamphlet sharply criticising Adams and advocating the casting of an equal vote by the Federalists for their two candidates, he greatly weakened his party, and deeply offended Adams and his immediate following. When, after the election, the famous contest for the Presidency arose in Congress, he suppressed his strong dislike for Jefferson, and by the use of his powerful influence was instrumental in securing the defeat of Burr. With the fall of the Federalists Hamilton's political career virtually ended. In 1804 Burr, who had at various times been balked in his political schemes by Hamilton, challenged the latter to a duel, on the ground of an alleged insult, and Hamilton, feeling that by refusing to acknowledge the accepted code, of which he strongly disapproved, he would lose his influence, and anticipating a crisis in the affairs of the nation with which he would probably be called upon to deal, consented to a meeting. The duel occurred at Weehawken, N. J., on July 11, and Hamilton fell, mortally wounded, at the first fire —having, it is said, discharged his own weapon into the air. He died the following day.

Hamilton's services to the nation can scarcely be overestimated. At a time when disintegrating tendencies were pronounced; when, British rule having been overthrown, the mass of the people were restive under any restraint; and when financial and economic ruin threatened the very existence of the nation, he contended steadily for the establishment of a strong Central Government, initiated various measures which were influential in bringing about such a result, and did more than any other man to put the nation on a firm financial footing, to restore the public credit, and to inculcate in the minds of the people sounder views than were then current with regard to political economy and finance. Judged by modern economic standards, some of his opinions show confusion of thought with regard to capital and wealth, but for the most part he undoubtedly saw further and clearer in his own special field than any of his contemporaries. He was not, however, like Jefferson, a great political leader, and, frankly distrusting the people, a large element of whom distrusted him in return, he never had a large personal following.

The best edition of Hamilton's *Works* is that by H. C. Lodge (9 vols., New York, 1885-86). Consult: J. C. Hamilton, *History of the Republic of the United States as Traced in the Writings of Alexander Hamilton and His Contemporaries* (7 vols., New York, 1857-64; 4th ed., 7 vols., Boston, 1879); J. C. Hamilton, *Life of Alexander Hamilton* (unfinished) (2 vols., New York, 1834-40); Morse, *Life of Alexander Hamilton* (2 vols., Boston, 1876); Shea, *Life and Epoch of Alexander Hamilton* (New York, 1879); Lodge, *Alexander Hamilton* (Boston, 1882), in the "American Statesmen Series;" Sumner, *Alexander Hamilton* (New York, 1890), in the "Makers of America Series;" and a brief sketch by Conant, *Alexander Hamilton* (Boston, 1901), in the "Riverside Biographical Series." A list of books concerning Hamilton, and of Hamilton's writings, is given in Ford, *Bibliotheca Hamiltonia* (New York, 1886).

HAMILTON, ANDREW (?-1703). A Colonial Governor of New Jersey. He was of Scottish birth, and before emigrating to East Jersey had been a merchant in Edinburgh. In 1686 he was appointed a member of Governor Lord Neill Campbell's council, and a year and a half later, December 10, 1687, on the latter's return to Europe, was appointed his substitute. While on a visit to London in 1692 he was regularly commissioned Governor of East Jersey, and soon afterwards received the appointment to the same office in West Jersey. In 1697 the proprietors

deposed him because of his Scottish birth, in accordance with an act of Parliament passed shortly after Sir George Barclay's attempt to assassinate King William; but in 1699 he was reappointed. In 1701 William Penn appointed him Deputy Governor of Pennsylvania. He was for some time Postmaster-General in America, and either he or his son, Col. John Hamilton, established the first colonial postal service under a patent dated 1694.

HAMILTON, Andrew (c.1676-1741). An American lawyer, born in Scotland. Of his early history nothing is known, nor is it certain that Hamilton was his real name, as he was for some time called Trent. About 1697 he came to Virginia, and afterwards removed to Philadelphia, where he was made Attorney-General (1717) and a member of the Provincial Council (1721). He was prothonotary of the Supreme Court and recorder of Philadelphia, a member of Assembly (1727) and its Speaker in 1729. He and his son-in-law built as a private property the State House, which later became Independence Hall. Hamilton is best known for his defense (1735) of John Peter Zenger (q.v.) on the charge of libel. He advanced as defense the truth of the publication, and gained a verdict of 'not guilty,' which did much for the freedom of political discussion, so that Gouverneur Morris styled him 'the dog-star of the American Revolution.' He was trustee of the General Loan Office and (1737) judge of the Vice-Admiralty Court of the Province of Pennsylvania.

HAMILTON, Anthony (1646-1720). An English courtier and French author of fables and of the scandalous *Mémoires du Chevalier de Gramont,* otherwise known as the *Histoire amoureuse de la cour d'Angleterre* (1713). He was born at Roscrea, Ireland, the third son of Sir George Hamilton, a son of the first Earl of Abercorn, and was brought up in France and as a Roman Catholic. This prevented his promotion by Charles II., at whose Court he was very popular, but furthered it under James II., who made him colonel of an Irish regiment and Governor of Limerick. After the fall of James he went back to France, where he found a patroness in the Duchess Ludovise of Maine. At her country-seat at Sceaux he wrote the famous *Mémoires.* His last public enterprise was a share in the fiasco of the Old Pretender in 1708. Hamilton's *Contes de féerie* aimed at once to rival and to ridicule the *Arabian Nights* of Galland (q.v.). They err through artificiality, and the intrusion of personal and local allusions. The *Mémoires de Gramont,* on the other hand, will always remain one of the most remarkable pictures that we possess of the noble younger son, the cadet of the *grand siècle*—light yet hard-hearted, keenly witty, profoundly skeptical, chivalrously brave when in view, capable of dastardly meanness behind the scenes. The *Mémoires* were printed in English in 1714. There is an illustrated translation with notes by Walter Scott (1811), and many editions in both languages. The *Fables* were first printed in 1730, and Hamilton's *Works* in six volumes in 1749. Editions after 1812 are more complete. Consult: Sainte-Beuve, *Causeries du Lundi,* vol. i. (Paris, 1857-62).

HAMILTON, Elizabeth (1758-1816). An author, of Scotch parentage, born in Belfast. She was educated by relatives in Stirlingshire, and began to write at an early age. *Hindoo Rajah* (1796), containing Eastern impressions of England; *Memoirs of Modern Philosophers* (1800); *Letters on Education* (1801-02); *Memoirs of Agrippina, the Wife of Germanicus* (3 vols., 1804); *Letters on the Formation of the Religious and the Moral Principle to the Daughter of a Nobleman* (1806), are her more serious works; but she is best known by her Scottish tale, *The Cottagers of Glenburnie* (1808), and the ballad "My ain Fireside." She was unmarried, but called herself Mrs. Hamilton, and was personally revered as a philanthropist.

HAMILTON, Emma, Lady (1761?-1815). Mistress of Horatio Nelson, the famous English admiral. She was a daughter of Henry Lyon, a man in very humble circumstances. Her career was for a long time an obscure one, and she gave birth to several illegitimate children. In 1784 she fell in with Sir William Hamilton, Ambassador at Naples, and he was captivated by her great beauty. She became his mistress, but he married her in May, 1791. At Naples she played a great social and political rôle, being an intimate of Queen Maria Carolina. Nelson first met Lady Hamilton at Naples in 1793, again in 1798, and from 1800 onward they lived together. In 1801 Lady Hamilton gave birth to a child, Horatia, by Nelson. After Nelson's death Lady Hamilton's affairs became involved, and in 1813 she was even arrested for debt. She died at Calais, on January 15, 1815. Her child by Nelson lived with the latter's sisters. She died March 6, 1881. Another child by Nelson died in infancy. See Nelson, Horatio.

HAMILTON, Frank Hastings (1813-86). An American surgeon, educated at Union College and in the medical department of the University of Pennsylvania. In 1861 he became professor in the Bellevue Hospital Medical College. He was a military surgeon for two years in the Civil War, and was appointed medical inspector with the rank of lieutenant-colonel in 1863. Among the many positions of honor and trust which he held was the presidency of the New York Society of Medical Jurisprudence. His services as consulting surgeon to various hospitals and asylums were highly prized, and he became widely known as an authority on surgery, his three large works having a recognized place in the literature of medical science. They are: *Treatise on Fractures and Dislocations* (1860); *Practical Treatise on Military Surgery* (1861); and *The Principles and Practice of Surgery* (1872).

HAMILTON, Gail. The pseudonym of Mary Abigail Dodge (q.v.).

HAMILTON, Gavin (1730-97). A Scotch painter and antiquary. He was born at Lanark. At an early age he was sent to Rome, where he studied painting under Massuchi. His best pieces were designed from the *Iliad,* such as "Achilles Beside the Dead Body of Patroclus," "Andromache Bewailing the Death of Hector," and "Helen and Paris." Hamilton, however, rendered greater service to art by his discoveries of precious fragments of ancient monuments than by his direct contributions to it. The latter part of his life was devoted to excavations in various parts of the Roman States, but especially at Civita Vecchia, Velletri, Ostia, and above all at Hadrian's villa at Tivoli. The statues, busts,

and bas-reliefs found by him form the most interesting portion of the Museo Pio-Clementino in the Vatican, after the treasures of the Belvedere. Many collections in England, Germany, and Russia are deeply indebted to his labors. To one of the best of these—the Townley Gallery—Hamilton contributed a large number of valuable marbles. In 1773 he published at Rome *Schola Italica picturæ*, illustrated after his own drawings of the great Italian masters.

HAMILTON, Lord George Francis (1845—). He was born in Brighton, England, and is the third son of the first Duke of Abercorn. He was educated at Harrow, entered the Rifle Brigade as ensign in 1864, and in 1868 was transferred to the Coldstream Guards, with a lieutenant's commission. In 1868 he entered Parliament as a Conservative from the county of Middlesex, and continued to serve from 1874 to 1880. From 1874 to 1878 he was Under-Secretary of State for India. With the return to power of the Conservative Party in 1885 he became First Lord of the Admiralty, an office which he occupied until 1892. During Lord Salisbury's third Administration he was Secretary of State for India. His naval reconstruction scheme of 1889 was the most extensive one ever adopted. Great credit is due him for ability and judgment displayed in dealing with the troubles in India. He was appointed provisional Grand Master of Middlesex County in 1892, served as chairman of the London School Board for the year of 1894, and was appointed Captain of Deal Castle in 1899.

HAMILTON, James (c.1710-83). A Colonial Governor of Pennsylvania, son of Andrew Hamilton (q.v.), the lawyer, and born probably in Accomac County, Va. He was prothonotary of the Supreme Court of Pennsylvania after his father's resignation, was six times a member of the Provincial Assembly, was elected Mayor of Philadelphia (1745), and a member of the Provincial Council (1746). Two years later he became Lieutenant-Governor, which office he resigned in 1754. He was prominent in the defense of the Colonies against the Indians in 1755, and was Deputy Governor (1759-63, 1771, and 1773). While the British held Philadelphia he was a prisoner on parole. He was prominent in educational and scientific circles after the war, acting as president of the Board of Trustees of Philadelphia College and head of the Philosophical Society.

HAMILTON, James (1769-1829). A British teacher of languages. Hamilton went to school for four years only, to two Jesuits in Dublin. As a business man he lived in France and Hamburg, where he learned German from an émigré, D'Angeli, who used no grammar, but taught by literal translation. On the rupture of the Peace of Amiens, Hamilton was 'detained' in France, and his Continental business was ruined. In 1815 he came to New York, intending to manufacture potash. Instead, he became a teacher of languages, combining the methods of his Jesuit teachers and of D'Angeli. This analytic method met with almost incredible success in New York City and in Philadelphia, where he published English interlinear translations of works in Greek, Latin, French, Italian, and German. Opposition to his methods in Baltimore College roused him to a defense which resulted in the total desertion by the students of the college to the Hamiltonian Institute. After teaching in many college towns of the United States and in Canada, he went to London (1823). Throughout England and Scotland he was again marvelously successful. Hamilton's great work was *History, Principles, Practice, and Results of the Hamiltonian System* (last ed. 1831).

HAMILTON, James (1786-1857). An American politician, born in Charleston, S. C. He received a good education in his native city, studied law, and soon attained a high position at the South Carolina bar. In 1812 he was appointed a captain in the army, and served in the campaigns on the Canadian frontier. He was Mayor of Charleston for several terms, and in 1822 while serving in that capacity he detected, and by his measures suppressed, a well-planned negro conspiracy. After serving in the State Legislature, he was in 1822 elected a member of Congress as a States Rights Democrat, to fill a vacancy, and was twice reëlected, serving until 1829. He was an ardent supporter of Andrew Jackson, both in 1824 and 1828, and after Jackson's election in the latter year he was offered the position of Secretary of War or of Minister to Mexico, both of which he declined. Returning to South Carolina, he was in 1830 elected Governor of the State on an extreme States Rights platform, and immediately recommended to the Legislature that it authorize armed resistance to the enforcement of the provisions of the tariff of 1828. He advised the passage of the Nullification Act, which brought affairs to a crisis, and in 1832 was appointed by Gov. Robert Y. Hayne, who in that year succeeded him in the Governorship, to the chief command of the State troops recruited to resist the National Government. He never acquiesced in the settlement of the trouble, and soon thereafter removed to Texas, where he became interested in some colonization schemes. In 1841 he was the accredited representative of Texas in Europe, and it was due to his efforts that the independence of the republic was recognized by England and France in that year. He next bent all his energies to securing the admission of Texas into the Union. In 1857 he was elected United States Senator from Texas, but was drowned in a steamship collision off the Texas coast before he took his seat.

HAMILTON, James (1814-67). A Presbyterian divine. He was born in Paisley, Scotland, November 27, 1814; educated at Glasgow and Edinburgh; entered the ministry, and from 1841 till his death, November 24, 1867, was minister of the National Scotch Church, Regent Square, London. His literary activity was very great, as aside from editorial labor he produced numerous volumes, and contributed the articles upon botany in Fairbairn's *Imperial Bible Dictionary* (London, 1867). His *Collected Works* were published in six volumes (London, 1869-73).

HAMILTON, James Cleland (1836—). A Canadian barrister and author. He was born at Belfast, Ireland, but was educated in America, and graduated at Toronto University. He published some travel sketches; but his more important work is contained in the papers upon literary and scientific subjects written for the Canadian Institute, of which he was elected vice-president, and printed in its *Proceedings*—such as *The Great Centre, an Astronomical Study*; and *The Panis, an Historical Outline of Ca-*

nadian Indian Slavery in the Eighteenth Century.

HAMILTON, Mount. See Lick Observatory.

HAMILTON, Patrick (c.1504-28). A precursor of the Scottish Reformation. He was born probably in the year 1504, either at Stanehouse or Kincavel. He was educated at the University of Paris, where he took his degree of A.M. in 1520, after which he probably proceeded to Louvain and Basel. In 1523 he was back in Scotland, and was admitted to Saint Andrews University. While abroad he had formed new tastes and interests, but for some time his opinions attracted no attention. Gradually, however, his convictions matured. From agreeing with Erasmus he came to agree with Luther, and about 1526 he appears to have announced his new views in such a manner as to draw the notice of Archbishop Beaton. Early in 1527 Beaton made 'inquisition' into the grounds of the rumor against him, and Hamilton fled to Wittenberg, where he became familiar with Luther and Melanchthon, and then passed on to Marburg, where the university was just opened. After six months he returned to his native country, in the autumn of 1527. He repaired to the family mansion at Kincavel, and there, in the neighborhood of Linlithgow, preached openly. In some way he was induced to go to Saint Andrews in January, 1528, and took up his abode in a lodging provided for him by the Archbishop. A conference was held, in which his opponents showed a conciliatory spirit, and even to some extent expressed concurrence in his views. He was allowed to depart in peace, and for some time to promulgate his sentiments in the city and University of Saint Andrews. After a month or so he was summoned to answer before Beaton to a charge of heresy. He was condemned for divers heresies and 'detestable opinions,' deprived of all dignities and benefices in the Church, and delivered over to the secular power to be punished. The sentence was carried out without delay. On the very same day on the morning of which he was tried (February 29, 1528), Hamilton was consigned to the stake in the front of the gate of Saint Salvador's College. His only publication is known as *Patrick's Places*, and is an evangelical treatise, written in Latin; it was translated by Frith (London, 1807). For his life, consult Lorimer (London, 1857).

HAMILTON, Robert (1743-1829). A Scottish writer on finance, born in Edinburgh, educated at the University of Edinburgh. He entered a banking house, but at the age of twenty-six left mercantile pursuits, and became successively rector of Perth Academy, professor of natural philosophy in Aberdeen University (1779), and professor of mathematics (1817). In 1777 he wrote an *Introduction to Merchandise;* in 1790, three essays on *Peace and War;* in 1822, *Management of the Poor*, a work displaying enlightened views on economics. His most important work is the *Essay on the National Debt*, which appeared in 1813. A posthumous volume published in 1830, *The Progress of Society*, is also of great ability, treating of economical principles by tracing their natural origin and position in the development of social life.

HAMILTON, Schuyler (1822-1903). An American soldier, a grandson of Alexander Hamilton. He was born in New York, graduated at West Point in 1841, served with great gallantry in the Mexican War, and was brevetted first lieutenant in 1846 and captain in 1847. From the latter year until 1854 he was aide-de-camp to Gen. Winfield Scott. He then resigned from the army, but upon the outbreak of the Civil War volunteered as a private in the Seventh Regiment, New York National Guard. He was rapidly promoted, becoming a brigadier-general of volunteers in 1861, and a major-general of volunteers in 1862. He was actively engaged in the operations against New Madrid, Mo., and Island No. 10, in the Mississippi River, and in the campaigns in Tennessee and Mississippi. Sickness compelled him to resign in 1863. He was hydrographic engineer in the Department of Docks, New York City, in 1871-73, and superintendent of yards in 1873-75, and subsequently, owing to ill health, lived in retirement. He wrote *A History of Our National Flag* (1852).

HAMILTON, Thomas (1789-1842). An English prose writer, of Scottish descent, born in Glasgow. He was educated at Glasgow University, and became the friend of Wordsworth and Scott. His novel *Cyril Thornton* (1827) was popular in its day, while in *Men and Manners in America* (1833) he showed himself a kindly critic, shrewd and humorous.

HAMILTON, Walter (1844-99). An English writer, born in London, and educated at the Collège de Dieppe. He was a fellow of the Royal Historical Society, vice-president of the Société Française des Collectionneurs d'Ex Libris, and vice-president of the Ex Libris Society. His published works include: *A Memoir of George Cruikshank* (1878); *The Origin of the Office of Poet Laureate* (1879); *The Poet Laureates of England* (1879); *The Æsthetic Movement in England* (1882); *Parodies of the Works of English and American Authors, Collected and Annotated* (5 vols., 1884-88); *French Book Plates for Ex Libris Collectors* (1892); *Dated Book Plates* (2 parts, 1894-95).

HAMILTON, William (1704-54). A Scottish poet, born at Bangour, Linlithgowshire. Between 1724 and 1727 he contributed lyrics to Allan Ramsay's *Tea Table Miscellany.* In 1745 he joined the cause of Prince Charles, and celebrated the battle of Prestonpans in an ode beginning, "As over Gladsmuir's blood-stained field." After the disaster of Culloden he lurked for several months in the Highlands, and at length escaped to France; but the influence of his friends at home procured him permission to return to Scotland. Broken in health, he went back to France, where he died. Though Hamilton wrote much graceful verse, his fame rests upon what Wordsworth called 'the exquisite ballad,' "The Braes of Yarrow."

HAMILTON, Sir William (1730-1803). Grandson of William Douglas, third Duke of Hamilton, born in Scotland. In 1764 he was appointed English Envoy Extraordinary and Plenipotentiary to the Court of Naples. During his residence there he devoted much time to a study of Vesuvius and other volcanoes, and embodied his results in *Campi Phlegræi* (2 vols. and suppl., Naples, 1776-79), and shorter papers. He was also an enthusiastic collector, particularly of ancient vases, which he seems to have been one of the first Englishmen to appreciate

for their artistic merit. His first collection was sold in 1772 to the British Museum for £8400, and formed the nucleus of the present department of Greek and Roman antiquities. This collection was described by D'Hancarville, in *Antiquités étrusques, grecques et romaines* (4 vols., Naples, 1766-67; and 2d ed., Florence, 1801-08). In 1787 he resumed collecting, and in 1798 sent a second collection to England for sale, but the vessel was wrecked, and only about two-thirds of the cases were recovered. The whole of the collection was drawn by Tischbein in his *Collection of Engravings from Greek Vases . . . in the Possession of Sir W. Hamilton* (Naples, 1791 et seq.). From 1793 to 1800 Hamilton took an active part in the diplomacy of the Court of Naples, but his health failed, and in 1800 he was recalled. A claim upon the British Government for special services was not allowed, but he was granted a pension of £1200. Hamilton's first wife was Miss Barlow, who died in 1782. In 1791 he married his mistress, Emma Lyon, who as Lady Hamilton is prominent in the life of Lord Nelson.

HAMILTON, Sir WILLIAM (1788-1856). An eminent philosopher of the Scottish school. He was born March 8, 1788, at Glasgow, where his father, Dr. William Hamilton, and his grandfather, Dr. Thomas Hamilton, held in succession the chairs of anatomy and botany. After gaining distinction, especially in the philosophical classes, at Glasgow, he went in 1807 to Balliol College, Oxford, as a Snell exhibitioner, and made a brilliant record for himself as a student of literature. He left Oxford in 1810, and instead of going into the practice of medicine, which he had studied, he became a member of the Scotch bar in 1813, but seems never to have had any practice in his profession except what became incumbent on him afterwards, on being appointed Crown solicitor of the Court of Teinds. In 1820, on the death of Dr. Brown, he was an unsuccessful competitor for the chair of moral philosophy in Edinburgh. In the following year, however, Hamilton was appointed to the professorship of history in that university. He took part in 1827 in the discussion of the scientific value of phrenology, and made careful investigations for himself of the brains of various animals in order to become acquainted at first hand with the facts of the case. In 1829 there appeared in the *Edinburgh Review* a critique of Cousin's *Cours de Philosophie* of the previous year, in which was developed Hamilton's famous doctrine of the infinite. The critique, which was entitled "The Philosophy of the Unconditioned," immediately drew attention to him from philosophers both in Great Britain and on the Continent. For some years after this Hamilton was a regular contributor to the *Edinburgh Review*, writing articles on philosophy, literature, medicine, education, and university reform. Many of these contributions were translated into German, French, and Italian. In 1852 they were all edited by Hamilton himself, with large notes and appendices, under the title of *Discussions in Philosophy and Literature, Education, and University Reform*. In 1836, after a severe contest, Hamilton was elected to the chair of logic and metaphysics in Edinburgh. In 1846 he published in two volumes *The Works of Thomas Reid*, carefully edited with notes and supplementary descriptions, which give fairly satisfactory views of his own philosophy. Extensive notes of his university lectures were taken by his students, numerous copies of them, transcribed from shorthand reports, were in circulation during the later years of his life, and formed the basis of Mansel and Veitch's edition. In 1844 he had a stroke of paralysis. He was, however, able, with an assistant, to perform the duties of his class till the close of session 1855-56, when his health suddenly became worse. He died May 6th. In logic Hamilton proposed the so-called doctrine of 'the quantification of the predicate' in affirmative propositions. In his view the predicate of every proposition has a definite logical quantity assigned to it in thought, and an explicit statement of this quantity simplifies logical operations. In this contention, Hamilton may properly be regarded as the forerunner of the algebraic school of logicians. (See LOGIC.) His psychology was a cumbersome analysis of psychic operations that perhaps went to the extreme length of 'faculty psychology.' In philosophy he was an exponent of the common sense Scottish school, but in some respects he went beyond the tradition of the school. Agreeing with Reid that 'the root of our nature cannot be a lie,' and that the deliverance of consciousness must be trusted, he accepted a naïve sort of natural realism, maintaining that we are directly conscious of the existence of external objects and of ourselves. And yet knowledge is often all relative. "To think is to condition." In this doctrine of the relativity of knowledge consists his departure from Scottish traditions, and it led him to maintain in the spirit of Kant that the unconditioned cannot be known. God is an object of faith, not of knowledge.

Philosophy, according to Hamilton, cannot say whether God is absolutely limited or absolutely unlimited. One or the other He must be, for between contradictions there is no compromise; but either characteristic is inconceivable. Again, our conception of causality is nothing positive. It is nothing but the *inability* of the mind to conceive an absolute beginning. So the infinity of space and time is the inability of the mind to conceive a point when space comes to an end or a moment after which time shall be no more. But this inability to think is no test of unreality. Thus philosophy is only a learned ignorance (*docta ignorantia*), or a well-assured conviction of the limits of our knowledge. In many ways this reminds one of Kant, from whom Hamilton indeed learned much. Some historians have characterized his philosophy as a hopeless attempt to unite the 'common sense' of Reid with the criticism of Kant. His philosophy of relativity changed in the hands of Herbert Spencer, who gave up 'common sense,' into agnosticism. Consult: Veitch, *Memoir of Sir William Hamilton* (London, 1869); id., *Hamilton*, in Blackwood's Philosophical Classics (Edinburgh, 1879); and *Hamilton, the Man and His Philosophy* (ib., 1883); J. S. Mill, *Examination of Sir William Hamilton's Philosophy* (London, 1878); Martineau, *Reviews and Addresses*, vol. iii. (London, 1891); A. Seth, *Scottish Philosophy* (Edinburgh, 1890); Stirling, *Sir William Hamilton* (London, 1865); Monck, *Sir William Hamilton* (New York, 1881). His principal writings are accessible in the four volumes of lectures edited by Mansel and Veitch, reprinted in two volumes

(Boston, 1859-60). A college edition of his writings was published in 1855, by O. W. Wight.

HAMILTON, William Gerard (1729-96). An English statesman, Chancellor of the Exchequer in Ireland. Of Scotch family, but born in London, he passed through Winchester College to Oriel, Oxford, though he did not graduate. He entered himself as a student at Lincoln's Inn (1744), but left the law for political life, and was a member of Parliament for both English and Irish boroughs. 'Single Speech Hamilton' was a misnomer, since Horace Walpole remarks upon the brilliance of his oratory on more than one occasion. Boswell mentions that he also charmed Dr. Johnson by his personality and conversation. He went to Ireland in 1761, as chief secretary to the Lord Lieutenant, and his own secretary was Edmund Burke. Hamilton was Chancellor of the Irish Exchequer (1763-84), and retired to England with a pension of £2000 a year. He was so notable a figure in his time that the *Letters of Junius* were ascribed to him, but he was more of a politician than a statesman. His published writings were collected by Malone under the title of *Parliamentary Logick* (1808).

HAMILTON, Sir William Rowan (1805-65). A Scotch-Irish mathematician, born at Dublin. His father, a solicitor, went to Dublin as a boy. William was remarkable as a child, having a good knowledge of Hebrew at the age of seven, and at twelve having studied not only Latin, Greek, and the leading modern languages of Europe, but also Syriac, Persian, Arabic, Sanskrit, Hindustani, and Malay. This devotion to languages was encouraged by his father because of the opportunities for service in the East India Company. During this same period his mathematical powers began to be manifest, and in his tenth year he entered a contest with the young American calculator (see Calculators, Remarkable) Zerah Colburn, who was then visiting Dublin, and, although defeated, made a creditable record. Before he went to Trinity College, Dublin (1823), in his eighteenth year, he had not only mastered Euclid, Newton's *Arithmetica Universalis* and the *Principia*, and Laplace's *Mécanique céleste*, but he had discovered an important error in the last-named work, and had written an original memoir on osculation of certain curves of double curvature. His career at Trinity was one of remarkable brilliancy. While only a second-year student he read before the Royal Irish Academy a "Memoir on Caustics," which attracted wide attention, and led Airy to assert that "it had made a new science of optics." While still an undergraduate (1827), Hamilton was appointed Andrews professor of astronomy and superintendent of the observatory, and soon after became Astronomer Royal for Ireland. He was twice honored with the gold medal of the Royal Society, first for his work on optics, and again for his contributions to dynamics. He was knighted in 1835, and was subsequently made president of the Royal Irish Academy, and corresponding member of the Academy of Saint Petersburg and of the *Académie des Sciences* of Paris.

Hamilton is chiefly known for his discovery of quaternions (q.v.). He announced the theory in 1844, and in 1848 began to lecture upon it at Trinity. His *Lectures on Quaternions* (1853) and *Elements of Quaternions* (posthumous, 1866; 2d ed. 1899) were not, however, written in a style to appeal to a large circle of mathematical readers, and it is owing chiefly to the work of Professors Tait and Kelland that the theory has attracted the attention that it merits. Consult Graves, *Life of Sir William Rowan Hamilton* (Dublin, 1882-89).

HAMILTON COLLEGE. An institution of higher education, situated at Clinton, N. Y. It was founded in 1793 by the Rev. Samuel Kirkland, a Congregational missionary among the Oneida Indians, for the education of the white and Indian population. The erection of a building, of which the corner-stone was laid by General Steuben in 1793, was brought to a standstill for lack of funds, and was only completed in 1797 through the untiring efforts of the founder. In that year the school was formally opened, and until 1812 was known as Hamilton Oneida Academy, deriving its name from Alexander Hamilton, one of its benefactors and trustees. In 1812, the necessary $50,000 having been collected, the institution was chartered by the University of the State of New York as Hamilton College. It grew steadily for a while, but during President Davis's administration differences arose between him and the students, and the college suffered in consequence. Under President North's administration, however, the institution developed into one of the best-known classical colleges in the United States, and has since maintained a national reputation, especially in the departments of rhetoric and oratory. It has made no effort to give 'university' or specialized training, but has consistently upheld high scholastic standards. The two courses offered are the classical and the Latin-scientific, both offering numerous electives. One fellowship, fifty-five scholarships, and a large number of prizes are available. The attendance in 1902 was 200, and the faculty numbered 20. At the same time the endowment was $500,000, the gross income $400,000, and the value of real estate and collections was estimated at $500,000. The library contains 43,000 volumes. The campus, covering 95 acres, is notable as representing the contributions of a large number of individual graduates and college classes in buildings, grounds, and other college improvements. The presidents of the college have been: Azel Backus (1812-16); Henry Davis (1817-33); Sereno Edwards Dwight (1833-35); Joseph Renney (1835-39); Simeon North (1839-57); Samuel Ware Fisher (1858-66); Samuel Gilman Brown (1866-81); Henry Darling (1881-91); Melancthon Woolsey Stryker (1892—).

HAMILTON INLET. An indentation of the Labrador coast, North America, 150 miles long, with a maximum breadth of 30 miles (Map: Canada, T 6). It forms the estuary of the Grand or Hamilton River (q.v.). From the north it receives the waters of Grand Lake.

HAMILTON RIVER. See Grand River.

HAMILTON SERIES. See Devonian System.

HAMITES, or **HAMITIC.** Designations applied to peoples and languages of the white or Caucasian branch of mankind settled from remotest times in Northern and Northeastern Africa and the Canary Islands. Both in biological character and in speech, as well as in situation and activities, they are nearest to the Semites.

The Hamites are in touch with African tribes south of the Sahara, and mixture with negroes has influenced the type of the population during thousands of years. On the other hand, Hamite culture has extended far from its original province. The eastern branch of the Hamites includes: (1) The ancient Egyptians, the oldest known people of the white race to develop a high civilization. Their descendants are the Copts, or native Christians, interspersed among the population, and the Fellahin or peasant class, speaking a Semitic language and practicing a Semitic religion.

(2) Farther up the Nile the Nubians, strongly negroid, are mixed with Hamite Bejas.

(3) The aboriginal population on the Abyssinian plateau. Agau Hamites.

(4) Ethiopian Hamites: Somalis, in many tribes; Gallas, one branch of whom, including Shoas and Amharas, extends into Abyssinia; Danakils in Afarland.

(5) Masai, in British East Africa, south of the Equator and east of the Victoria Nyanza. They are Hamites in language, have dark skin and frizzled hair, and are physically among the most magnificent races.

(6) Wahuma or Watusi, the ruling race in Northwestern German Africa, almost identical in speech and biological character with the Gallas. Passing westward from the Egyptian area along the north of Africa, the Berber Hamites, including Tuaregs, Shluhs, and Kabyles, occupy the littoral region and the Sahara. They are the descendants of the oldest known inhabitants of this territory, who were believed to have been the founders of the Mediterranean race.

(7) Tibus or Tubus, Hamites of the Sahara north of Lake Chad, mixed with negroes. Their speech is of doubtful affiliation.

(8) Fulah or Fulbe, in extreme Western Africa, in Futa-tor and Futa Jallon.

(9) Guanches, ancient Hamites of the Canaries.

Each of the separate peoples here named is described in its proper place. Among the Hamites are tribes that show blond characteristics, but it cannot be decided whether this is due to albinism or to invasion of Teutonic nations. The standard color is dark brunette; the hair is black and curly, the body is over medium height, and in some tribes of great stature. The Hamites have, in recent years, come into especial prominence through their connection with the origin of Mediterranean peoples and early culture, some ethnologists tracing their type into the heart of Europe. Hamitic speech in its three varieties, Egyptian, Ethiopian, and Berber, belongs to the inflected class, near to the Semitic, from which it has been separated for millenniums. The oldest writing in the world is the hieroglyphic inscriptions placed on their monuments by the Hamitic Egyptians. They also were the earliest engineers, machinists, and architects in massive stones. Consult: Sergi, *Africa: Anthropologia della stirpe camitica* (Turin, 1897); Stanford, *Africa* (London, 1895); Keane, *Man, Past and Present* (London, 1899).

HAMIT'IC LANGUAGES. See AFRICAN LANGUAGES.

HAM'LET. See AMLETH.

HAMLET. An opera by Ambroise Thomas (1868), the French libretto being adapted by Barbier and Carré from Shakespeare. An Italian version, *Amleto*, was presented in 1869 in London.

HAMLET. (1) The common spotted moray (q.v.). (2) The Bermuda grouper. See GROUPER.

HAM'LEY, Sir EDWARD BRUCE (1824-93). An English general and author, born at Bodmin, son of Vice-Admiral William Hamley, and educated at Woolwich. In 1854 he was made adjutant, and later became aide, to Richard Dacres, and served through the Crimean War. He was appointed professor of military history at Sandhurst in 1859, and in 1882 he went with Sir Garnet Wolseley to Egypt, fought at Tel-el-Kebir, and was much aggrieved that his division was not recognized, insisting that it had won the day. He was made general in 1890, as a recompense for his ill-treatment. Hamley's best-known works are: *The Story of the Campaign of Sebastopol* (1855); *The Operations of War Explained and Illustrated* (last ed. 1878), an excellent work; *The War in the Crimea* (1891); *Lady Lee's Widowhood* (1854); and reprints from *Blackwood*, with which he was long connected.

HAM'LIN, ALFRED DWIGHT FOSTER (1855—). An American architect, born at Constantinople, Turkey, the son of Cyrus Hamlin, founder of Robert College there. He graduated at Amherst in 1875; subsequently studied at the Massachusetts Institute of Technology and at the Ecole des Beaux-Arts in Paris. In 1883 he became special assistant in Columbia University. He was appointed assistant professor of architecture there in 1889, adjunct professor of architecture in 1891, and afterwards professor of architecture. Among his publications, in addition to many magazine articles, are: *A History of Architecture* (1896), and a *Handbook of the History of Ornament*.

HAMLIN, CYRUS (1811-1900). An American Congregational missionary and educator. He was born at Waterford, Me., and graduated at Bowdoin College in 1834, and at Bangor Theological Seminary in 1837. In the latter year he went to Constantinople, as a missionary under the direction of the American Board. In 1860 he began the work of establishing Robert College at Constantinople, and succeeded in spite of the strong opposition of the Turkish authorities. He acted as its president until 1876, and then became professor of dogmatic theology in Bangor Seminary. In 1880 he was elected president of Middlebury College, Vt., which post he retained till 1885. He published *Among the Turks* (1877), and *My Life and Times* (1893).

HAMLIN, HANNIBAL (1809-91). An American political leader, vice-president of the United States in 1861-65. He was born at Paris Hill, Me., and prepared for college at Hebron Academy, but his father's death prevented his taking a college course. After some years spent in running the home farm and a short period as proprietor of a country weekly at Paris, he studied law, was admitted to the bar, and in 1833 began practice at Hampden, Maine. His long political career of almost a half-century began in 1835 with his election to the lower branch of the Maine Legislature as a Democrat. To this he was a number of times reëlected, and served as its presiding officer in 1837, 1839, and 1840. In the last year he was a Democratic nominee

for Congress, but was defeated in the Whig landslide of that year. Two years later he was elected to the Twenty-eighth Congress, and was reëlected to the Twenty-ninth, serving from 1843 to 1847. Early in his Congressional career he took a pronounced stand as an anti-slavery man, opposed the annexation of Texas, and drew particular attention to himself by introducing the famous Wilmot Proviso (q.v.) during the temporary absence of its author, and securing its acceptance by the House by a vote of 115 to 106. In 1848 he was elected to the United States Senate to fill a vacancy caused by the death of Senator Fairfield. In spite of his action in speaking and voting against Clay's compromise measures, he was reëlected for a full term of six years in 1851. Before the completion of this term, however, he had taken an active part in the founding of the Republican Party, and resigned his seat in the Senate in 1856 upon being elected by that party Governor of his native State. In 1857, however, he resigned from the Governorship to resume his seat in the Senate, to which he had been reëlected, and where he thought he could be of more use to the anti-slavery cause than in the Governor's chair. He remained in the Senate until after his election; in 1860, as Vice-President of the United States on the ticket with Abraham Lincoln. During the Civil War he was a valued adviser of President Lincoln, and the relations between the two were especially intimate. He was again United States Senator, 1869-81, and was Minister to Spain, 1881-83. Consult C. E. Hamlin, *Life and Times of Hannibal Hamlin* (Cambridge, 1899).

HAM'LINE, Leonidas Lent (1797-1865). A Methodist Episcopal bishop, born in Burlington, Conn. He studied for the ministry, but afterwards read law, and practiced in Ohio. In 1830, however, he became a preacher in the Methodist Church, in 1836 was chosen assistant editor of the *Western Christian Advocate*, and four years later chief editor of the *Ladies' Repository*. In 1844, when the Methodist Church divided on slavery, he was a member of the General Conference, and drew up the plan of separation. He was elected bishop at that session, and served until 1852. Hamline University, Minnesota, was named in his honor. A number of his sermons are given in the *Works of L. L. Hamline, D.D.*, edited by Rev. F. G. Hibbard, D.D. (1869). Consult Palmer, *Life and Letters of Leonidas L. Hamline, D.D.* (New York, 1866).

HAMLINE UNIVERSITY. A coeducational Methodist Episcopal college at Hamline, Minn., midway between Saint Paul and Minneapolis. It was situated at Redwing until 1869, when it was closed, and reopened in 1880 at Hamline. It has a preparatory department with about 100 students; a college of liberal arts, with an attendance of 200; and a college of medicine, with 150 students, at Minneapolis. The college faculty in 1902 numbered 20, and the medical faculty 48. At the same time the university library contained 6000 volumes, the buildings and grounds were valued at $150,000, the endowment was $200,000, and the annual income was $24,000.

HAMM, häm. The capital of a circle in the Prussian Province of Westphalia, situated at the confluence of the Ahse with the Lippe, 23 miles northwest of Arnsberg (Map: Prussia, B 3). It is surrounded by old ramparts and a moat, and contains a Catholic church dating from 1510, and an old gymnasium. It is at the junction of several railroad lines, and produces many varieties of iron articles, gloves, flour, liquors, starch, leather, bricks, etc. In the vicinity are thermal baths. Hamm was formerly the capital of the County of Mark and a member of the Hanseatic League. Population, in 1890, 24,969; in 1900, 31,371.

HAMMACHER, hä'mäg ĕr, Friedrich (1824-1904). A German politician, born at Essen, and educated at Bonn and Berlin. He had to leave the Government service in 1850 because of his part in the rising of '48, and went into business. He soon became interested in the mining industries of the Rhine District and of Westphalia, and founded at Dortmund a union for mining interests. A member of the Prussian House of Deputies (1864-68), and of the Reichstag from 1869 to 1898, with two interruptions, he was one of the founders and leaders of the National Liberal Party; took an especial interest in economic questions, and drew up the declaration of more than two hundred Deputies, which, in 1878, altered Bismarck's commercial policy. He was one of the promoters of a Government system of railroads in Prussia in the following year, and a founder and director of the German Colonial Union. In 1889 he mediated the disagreements between the Rhenish Westphalian miners and mine-owners in the coal strike of that year.

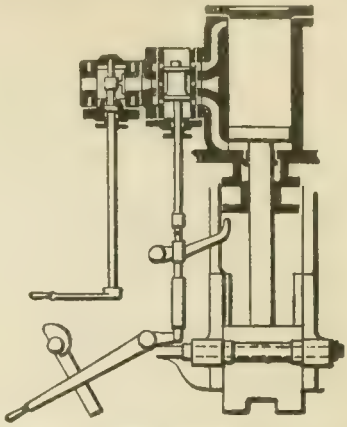
HAMME, häm'me *or* häm. A town in the Province of East Flanders, Belgium, situated on the right bank of the Durme, 18 miles east-northeast of Ghent (Map: Belgium, C 3). It contains grain and oil mills, has manufactures of lace, ribbons, and linen, and carries on trade in flax. Population, in 1890, 12,039; in 1900, 13,755.

HAMMER (AS. *hamor*, Icel. *hamarr*, OHG. *hamar*, Ger. *Hammer;* connected with OChurch Slav. *kamy*, Lith. *akmŭ*, stone, Gk. *ἄκμων*, *akmōn*, anvil, Skt. *aśman*, stone). A tool used for applying the force of impact either for the purpose of beating or forging malleable materials into a specific shape, or for driving nails, spikes, wedges, etc. Hammers may be divided into two general classes, viz. hand hammers and power hammers. Hand hammers are made in a variety of forms to suit the particular purposes for which they are employed. They are all made with a steel or iron head set crosswise of a wooden handle. The part of the hammer which strikes the work is called the face, and the opposite part is called the pane. The pane of the ordinary carpenter's hammer is bent, and has a V-shaped notch to permit its use as a lever for drawing nails; that of a geologist's hammer is wedge-shaped, etc. Many hammers have two faces, either of which may be used indifferently. Hammers of large size requiring the use of both hands to wield them are commonly called sledges, and usually have two faces.

Power hammers are of several forms, the most important of which is the direct-acting steam hammer and its modifications, the drop-press and drop-hammer. One of the oldest forms of power hammer is the tilt-hammer, which consists essentially of a handle working on a horizontal axle at or near one end, and having a head at the other end. The handle and head are usually made of iron, and very heavy. This

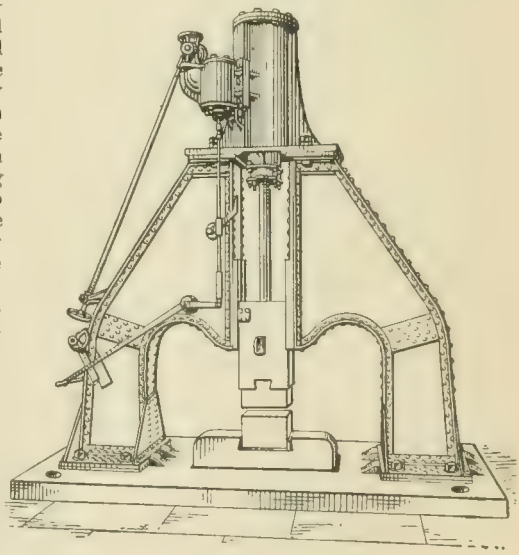
type of hammer is operated by a cam or eccentric (see CAM; ECCENTRIC), which swings up the head end one or two feet and lets it drop. An anvil placed so as to receive the blow is an essential part of the mechanism. Various modifications of this simple device have been devised, but, like the original form, they have become practically obsolete in forging operations, having been replaced by the direct-acting steam hammer. This tool was invented by James Nasmyth, who first conceived the invention in 1839, but did not patent it until 1842. Meanwhile a steam hammer had been actually built at the ironworks of Le Creusot, France, the idea of which, according to English writers, had been obtained from Nasmyth's preliminary sketches, to which the French builders had had access. Be this as it may, the fact is that the first Nasmyth hammer was erected at the Bridgewater Foundry at Patricroft, near Manchester, England, in 1843. This hammer consisted of two vertical uprights or columns surmounted by an entablature, which carried an inverted vertical steam cylinder midway between the two columns. In this cylinder was a piston, with a piston-rod projecting downward between the two columns and carrying at its end a casting which formed the hammer proper. An anvil block occupied the space between the feet of the columns, and received the blow of the hammer. To operate the hammer steam was admitted to the cylinder below the piston, which raised it with its attached piston-rod and hammer to any height desired, limited by the height of the cylinder; when at the desired height the steam was allowed to escape into the air, and the piston and its attachments fell by gravity. The force of the blow depended upon the weight of the hammer and the height of the fall. The hammer was worked by means of an ordinary slide-valve and a long lever, requiring great labor and constant attention in order to give the blow required; so that some contrivance capable of adjustment was necessary in order to have complete command over the power of the blow, and in order that, the instant the blow was struck, the block should rise again, so that not only no loss of time should ensue, but that the heat in the mass of iron on the anvil might not be reduced or carried off by the cold face of the block. The peculiar difficulty of securing a true automatic arrangement will be seen when it is considered that the instant of percussion must vary with almost every blow that is struck; for the piece on the anvil becomes thinner and thinner by each succeeding blow, and in flat bars a blow is first given on the flat side, and then on the edge, the difference in the fall of the hammer in the two cases being oftentimes several inches; and further, that the hammer must be under perfect control at all times.

Nasmyth, after many and protracted trials, failed to produce the motion required, and, as a consequence, the whole hammer scheme was on the point of being abandoned. In this dilemma, and during Nasmyth's absence from the works, his partner, Gaskell, applied to their engineering manager, Robert Wilson, who afterwards became managing partner and successor to Nasmyth, to endeavor to solve the problem which had hitherto baffled the skill of Nasmyth. Wilson took the matter in hand, and in little more than a week a mechanism was invented and attached to a hammer upon which former experiments had been made, and was at once found to answer most admirably every condition required. Under the influence of this very beautiful mechanical device every variety of blow



STEAM HAMMER.
Section showing cylinder and valve mechanism.

could be given—from the gentlest tap to the heaviest blow within the compass of the hammer—and that, too, perfectly self-acting in every respect, the long lever and the hard work before



STEEL-HAMMER.
For forging iron and steel

referred to being now entirely banished. By simply altering the position of the tappet lever by means of two screws, a blow of the exact force required could be produced and continued so long as steam was supplied. On August 18, 1843, the first hammer was delivered to the Low Moor Iron Works, near Bradford, Yorkshire, and gave such satisfaction that orders for this remarkable tool began to flow in from all parts of the country. The hammer remained in this condition, with the exception of a few minor details, from 1843 to 1853, when Wilson (who had become connected with the Low Moor Iron

Works) invented, patented, and applied to the hammers at Low Moor and elsewhere what is called the 'circular balanced valve.' He later devised for the steam locomotive a balanced slide valve, in which, by a most ingenious arrangement, the valve is allowed to float, as it were, in an atmosphere of steam pressing equally upon it on every side, entirely doing away with all superincumbent pressure upon the *valve*, no matter what the pressure in the *boiler* may be. The great advantage of this invention will be apparent when it is stated that hammers are now made of such a size that if the valve were not balanced a small steam-engine would be required to move it. In June, 1861, Wilson patented and introduced another very important improvement, popularly known as the *double-acting hand-gear motion*. By this arrangement, the steam is admitted as before to *raise* the piston, and when it has attained the required elevation, and at the very moment when about to descend, by slightly increasing the travel of the hand lever (more than when working single-acting), the steam is admitted into the cylinder *above* the piston, which accelerates and increases the intensity of the falling blow and the consequent capacity of the hammer so much that a 5-ton hammer is, by this double-action arrangement, increased to at least a 12½ or 15 ton one.

Since 1861 the chief improvements in steam hammers have been in the nature of mechanical improvements in detail and construction to enable larger hammers to be built. A steam hammer of great size was erected at the Bethlehem Steel Works, South Bethlehem, Pa., in 1889, to be used in forging armor plates and other large steel objects. The steam cylinder is 76 inches in diameter, and has a stroke of 16½ feet, and the weight of the moving parts is 125 tons: the anvil is made up of three 22-inch iron blocks, each weighing 70 tons. This hammer, it is interesting to note, has been put out of commission. At Perm, Russia, there is a 50-ton hammer; at the Terni Steel Works, in Italy, one of 100 tons; at the Krupp Works at Essen, Germany, one of 50 tons; at Woolwich Arsenal, England, one of 25 tons; and at Le Creusot, France, one of 50 tons. Recently steam hammers have been replaced by hydraulic presses for forging armor plate and similar large forgings, and they are now seldom built in the large sizes stated above. In smaller sizes for making drop-forgings (see FORGE, FORGING), and for forging the vast majority of smaller work, they are still extensively used. In some works compressed air is used in place of steam for operating their hammers. For a description of a class of compressed-air operated hammers for light work, such as driving rivets, calking, etc., see PNEUMATIC TOOLS. The steam hammer doubtless ranks as one of the most important economic inventions of all time.

HAMMER, hä'mēr, JULIUS (1810-62). A German poet, born in Dresden. He studied jurisprudence at Leipzig, but in 1834 made the acquaintance of Tieck and Theodor Hell by his play *Das seltsame Frühstück*, and decided to devote himself to literature. It was largely due to him that the Schiller Society was formed at Dresden in 1855. The early period of his literary activity was taken up with fiction of comparatively small value, only *Einkehr und Umkehr* (1856) deserving mention; and his dramatic attempts met with little success and had not much worth. He is best known for his poetry: the popular collection of proverbs, *Schau um dich und schau in dich* (1851, 33d ed. 1892). A similar didactic tendency is characteristic of his other lyric productions, *Zu allen guten Stunden* (1854); *Fester Grund* (1857); *Auf stillen Wegen* (1859); *Lerne, liebe, lebe* (1862), all republished many times. He also published a poetic version of the Psalms, *Die Psalmen der heiligen Schrift* (1861); *Unter dem Halbmond* (1860); and the religious anthology *Leben und Heimat in Gott* (13th ed. 1896). Consult Ende, *Julius Hammer* (Nuremberg, 1872).

HAMMER, THE. A popular name for Judas Maccabæus.

HAMMER AND SCOURGE OF ENGLAND, THE. A popular title for William Wallace.

HAMMER-CLOTH. A cloth which covers the driver's seat in some kinds of carriages, said to be so called from the former custom of using the box as a receptacle for tools. Another explanation of the name is that it is a corruption of hammock-cloth, the seat which the cloth covers being formed of straps or webbing stretched between two crutches, as a sailor's hammock is suspended, to secure ease of motion. A third suggestion has been made that *hammer* is a corruption of the Dutch *hemel*, canopy. Hammer-cloths are usually ornamented with fringes, and bear the arms of the proprietor of the carriage. They are old-fashioned, and now seen only on the ceremonial carriages of royalty.

HAMMERFEST, hä'mēr-fĕst. A seaport of Norway and the most northern town in the world, situated in latitude 70° 40′ 11″ N., and longitude 23° 30′ E., on the west shore of the island of Kvalö, in a barren, treeless district (Map: Norway, L 1). The town is almost entirely built of wood. The sun is above the horizon from the 13th of May to the 29th of July. Its absence for several months in the winter has led to the extensive introduction of electric lighting, the power being derived from waterfalls. The chief occupations of the people are the production of cod-liver oil and walrus-hunting. There is an active trade with the Russian port of Archangel. Population, in 1891, 2188; in 1901, 2298.

HAMMERHEAD, or **HAMMERFISH.** (1) A shark of the genus Sphyrna, consisting of four or five species, and constituting a family, Sphyrnidæ, distinguished from all other fishes by the extraordinary form of the head, which in the adults resembles a double-headed hammer, with the eyes at the ends of the lateral extensions. The mouth is below the centre of the head. Some of the species attain a length of fifteen feet, and are very voracious. The great hammerhead (*Sphyrna zygæna*) is found in all warm seas, occurring on the coast of the United States and Europe. These sharks are ovoviviparous, and produce about 40 young at a birth. See Plate of GREAT SHARKS. (2) See HAMMERKOP.

HAMMERHEAD BAT. An extraordinary fruit-eating bat (*Hypsignathus monstrosus*), discovered about 1860 by Du Chaillu in the Gabun region of West Africa. It is about five inches long, and has the nose greatly swollen and pro-

lenged, as shown in the illustration of its head on the Plate of BATS. Nothing is known of its habits.

HAMMERICH, hä'mēr-ik, MARTIN JOHANNES (1811-91). A Danish linguist and teacher, brother of Peter Frederik Adolf Hammerich, historian and theologian. He studied theology, but early showed interest and marked ability in mythology and philology; received his degree in 1836, was instructor of Sanskrit at Copenhagen from 1841 to 1844, and was head of a gymnasium at Christianshavn. His important works are: a translation of the *Sakuntala* of Kalidasa (last edition, 1879); *Om Ragnaroksmythen* (1836); *Bidrag til en Skildring af Holberg* (1858); *Ewalds Levned* (1860); *Danmark-Norges Litteratur i kort Overblik* (1864); *Thorvaldsen og hans kunst* (1870).

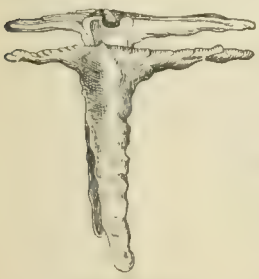
HAMMERKOP. The Dutch name in South Africa for a bird, the umbrette (q.v.), Anglicized as 'hammerhead.'

HAMMER OF HERETICS. A title applied to Saint Augustine; also to Pierre d'Arlly, president of the Council of Constance (1414-18).

HAMMER OF THE SCOTCH, THE. A popular name for Edward I. of England. It appears on his tombstone in Westminster Abbey.

HAMMER-PURGSTALL, häm'mēr pōōrg'stäl, JOSEPH, Baron (1774-1856). An Austrian historian and Orientalist, born at Gratz. He studied in the Oriental Academy of Vienna, took part in the publication of an Arabic-Persian-Turkish lexicon, and was appointed interpreter to the Internuncio at the Porte in 1799, continuing in the Austrian diplomatic service until 1817, when he was made Aulic Counselor. In 1847-49 he was president of the newly established Academy of Sciences of Vienna. Meanwhile he wrote constantly on many subjects connected with the history and literature of the Orient. He translated from the Arabic, Persian, and Turkish works previously unknown in Europe. One of his most important contributions was the *Litteraturgeschichte der Araber* (1850-56), and one of his best known, the *Diwan des Hafiz* (1812). He also wrote the *Geschichte der Assassinen* (1818), and *Geschichte der osmanischen Dichtkunst* (1836-37).

HAMMERSCHMIDT, hä'mer-shmīt, ANDREAS (1611-75). A Bohemian musician, born at Brüx. In 1635 he became organist of Saint Peter's, Freiberg, and four years later accepted a like position at Zittau. He remained there for nearly forty years, and upon his death a statue was erected to his memory. His compositions were of great importance at their time, and include: *Weltliche Oden* (1650); *Chormusik fünfter Theil* (1652); *Kirchen- und Tafelmusik* (sacred concertos, 1662).



HAMMER-SHELL.

HAMMER-SHELL. An Oriental bivalve mollusk, of the wing-shell family (Aviculidæ) and genus Malleus, remarkable for the T-shape of its shells, which are expanded along the hinge margin. It is also called 'hammer-oyster,' and the flesh is eaten.

HAM'MERSMITH. A metropolitan borough of London, Middlesex, England, on the left bank of the Thames, 6 miles west-southwest of Saint Paul's; formerly a suburban village with large nursery and market-gardening interests (Map: London, E 5). It has numerous educational and benevolent institutions and is a populous Roman Catholic centre. It is traversed by several important railways. Population in 1891, 97,283; in 1901, 112,245.

HAMMOCK. The apparatus in which a sailor slings his bed derives its name through the Spanish *hamaca,* from a Peruvian word, the custom of thus suspending a bed having been derived from Peru, where the natives fasten the two ends of a piece of canvas, or of a netting of grass twist, to the branches of a tree. A sailor's hammock consists of a rectangular piece of hempen or cotton canvas, about six feet long and three in width, gathered together at each end by means of cords and a clew, and hung to hooks under the deck. The hammock thus suspended forms a sort of bag capable of containing the sailor's mattress, his blankets, and himself, as soon as he has acquired the far from easy knack of climbing into it. The hammocks are taken below at sunset and hung in rows about two feet apart, in the men's portion of the ship. When done with in the morning the bedding is carefully tied up within each, and the whole stowed in the *hammock-netting,* which is no longer a netting, but is a locker or box-shaped receptacle, and is generally in the bulwarks of the waist.

HAM'MOND. A city in Lake County, Ind., 21 miles south by east of Chicago, Ill.; on the Grand Calumet River, and on the Erie, the Michigan Central, the Baltimore and Ohio, the Wabash, and several other railroads (Map: Indiana, B 1). With its exceptional railroad facilities, the city is of considerable importance as a commercial and manufacturing centre. The industries include extensive steel-spring and chemical works, nail-mills, a slaughtering and meat-packing plant, flour-mills, carriage-works, a distillery, starch-works, a glue-factory, brick-yards, etc. Settled in 1869, Hammond was incorporated in 1883, the charter of that date being still in operation. The government is vested in a mayor, chosen every four years, and a city council, which elects administrative officials. The water-works are owned and operated by the municipality. Population, in 1890, 5428; in 1900, 12,376.

HAMMOND, ANTHONY (1668-1738). An English pamphleteer and poet. He was born in Huntingdonshire, for which he was elected a member of Parliament in 1695. As a fluent and well-informed speaker on financial questions, he soon gained a considerable reputation, but his lack of tact stood in his way. He was twice chosen as member for Cambridge University, and in 1701 was appointed a commissioner for stating the public accounts. The following year he was made a commissioner of the Navy, under Godolphin's Administration. After another term as member of Parliament he went in 1711 to Spain as paymaster of the British forces there, but soon retired and devoted himself to literary pursuits. In 1720 he edited a *New Miscellany of Original Poems, Translations and Imitations,* and he also

published several pamphlets on political and financial subjects.

HAMMOND, Edward Payson (1831—). An American evangelist. He was born at Ellington, Conn.; graduated at Williams College in 1858, and studied theology at the Union Theological Seminary, New York, and at the Free Church Seminary, Edinburgh. After being ordained to the Presbyterian ministry in 1863, he engaged in evangelistic work in the United States, Canada, and Great Britain, and met with remarkable success. He wrote many tracts and a number of hymns for use in his work. His work is described by Headley, in *The Reaper and the Harvest* (1884).

HAMMOND, Henry (1605-60). A learned English divine and controversial writer, born at Chertsey, Surrey. He was educated at Magdalen College, Oxford, and in 1629 became rector of Penshurst. His devotion to Charles I. cost him the living; nevertheless he continued to act as chaplain to the King until 1647, when all the royal attendants were dismissed. After that he was subdean of Christ Church, Oxford, but was soon imprisoned, and spent the rest of his life in Worcestershire. His separate works numbered fifty-eight, the most celebrated of which are the *Practical Catechism* (1644), and *Paraphrase and Annotations on the New Testament* (1653). His *Miscellaneous Theological Works* have been published (1847-50). His *Life*, by Fell, Bishop of Oxford (London, 1661), is a charming biography, and has been followed by several modern biographers.

HAMMOND, Jabez D. (1778-1855). An American author and politician, born in New Bedford, Mass. He practiced medicine in Vermont, but afterwards studied law and followed that profession at Cherry Valley, N. Y. He was a Democratic Congressman from New York in 1815-17, a State Senator in 1817-21, and in 1825 was made a commissioner in the settlement of the claims of New York against the Federal Government. In 1838 he was elected county judge at Albany, where he had lived since 1822, and he was one of the regents of New York University from 1845 until his death. His published works include: *The Political History of New York to December, 1840* (1843); *Life and Opinions of Julius Melbourn* (1847); and *Life of Silas Wright* (1848).

HAMMOND, James Henry (1807-64). An American politician. He was born in Newberry District, S. C., graduated at South Carolina College in 1825, and was admitted to the bar in 1828. In 1830 he became editor of the *Southern Times*, published at Columbia, S. C. He entered Congress in 1835, was Governor of South Carolina in 1842-44, and was a member of the United States Senate from 1857 to 1860. Both as an editor and as a member of Congress he was a vigorous exponent of nullification and States' rights, and a defender of the institution of slavery. Several letters written by him in defense of slavery, as a reply in part to an anti-slavery circular by Clarkson, were published, with various essays advocating the same view, in a volume entitled *The Pro-Slavery Argument* (1853).

HAMMOND, John Hays (1855—). An American mining engineer, born at San Francisco. He graduated at the Sheffield Scientific School of Yale University in 1876, and after a mining course at the Bergakademie, Freiberg (Saxony), Germany, he was appointed mining expert on the United States Geological Survey and Mineral Census for the examination of California gold-fields. In 1882 he became superintendent of silver-mines at Sonora, Mexico, and later was consulting engineer to a mining company at Grass Valley, Cal. He then became consulting engineer to an iron company in San Francisco and to the Southern and Union Pacific railway companies. In 1893 he was appointed consulting engineer to the various mining companies operated by a London firm in South Africa, and later to the British South Africa Company, known as the Chartered Company, to the Consolidated Gold Fields Company, and other organizations of promoters acting in that region. While in South Africa he was connected with the Jameson raid, was tried for complicity in the revolt against the South African Republic, and was sentenced to death. This sentence was, however, commuted to fifteen years' imprisonment, and later Hammond was released by the Boer authorities upon the payment of a fine of $125,000. Afterwards he established himself in London, whence he directed mining interests in Mexico and the United States.

HAMMOND, Robert (1621-54). A soldier in the English Civil War. He was born in Surrey, was educated at Oxford, and in 1643 was appointed captain in one of the cavalry regiments of the Parliamentary forces which were then being organized. His career in the earlier part of the war was so creditable that he was made colonel of an infantry regiment in 1645. He was present at the battle of Naseby, and at the capture of Bristol and of Dartmouth. In the struggle which soon afterwards began between the army and Parliament, Hammond at first sided with the former, but his scruples finally compelled him to change his mind, and he resigned from military service, accepting the appointment of Governor of the Isle of Wight. King Charles I., having been led to expect that he would be befriended by Hammond, threw himself upon the latter's protection; but Parliament ordered the King to be kept in custody, a duty which the Governor performed, with many misgivings, from November 13, 1647, to November 29, 1648. In 1654 Hammond was appointed by Cromwell a member of the Irish Council, but he died in Dublin shortly after his arrival.

HAMMOND, Samuel (1757-1842). An American Revolutionary soldier. He was born in Richmond County, Va., and as a youth took part in Indian warfare. In the Revolution he participated in the battles of King's Mountain, Cowpens, Eutaw Springs, and other engagements. In 1803-05 he was a member of Congress from Georgia; from 1805 to 1824 was military and civil Governor of Upper Louisiana; and from 1831 to 1835 was Secretary of the State of South Carolina.

HAMMOND, William Alexander (1828-1900). An American neurologist, born in Annapolis, Md. He graduated in medicine at New York University in 1848; was assistant surgeon in the United States Army from 1848 to 1850, and surgeon from 1850 to 1860; professor of anatomy and physiology in Maryland University from 1860 to 1861; and again surgeon in the United

States Army from the outbreak of the rebellion in 1861. He was Surgeon-General of the Army, with the rank of brigadier-general, from 1862 to 1864, when he was dismissed from the service upon the charge of official corruption after trial by court-martial. In 1878 President Hayes, under authorization of Congress, reviewed the findings of the court-martial, following which action Dr. Hammond was restored to his rank and placed on the retired list as a brigadier-general. He was professor of mental and nervous diseases in Bellevue Hospital Medical College from 1867 to 1873, and occupied the corresponding chair in New York University from 1873 to 1882. In 1882 he became a founder of the New York Postgraduate Medical School, in which he was professor of mental and nervous diseases till his death. He established the *Quarterly Journal of Psychological Medicine and Medical Jurisprudence*, and was a founder of the New York *Medical Journal*. Among his published works are: *Physiological Memoirs* (1863); *Military Hygiene* (1863); *Lectures on Venereal Diseases* (1864); *On Wakefulness* (1866); *Sleep and Its Nervous Derangements* (1869); *Insanity in Its Medico-Legal Relations* (1866); *The Physics and Physiology of Spiritualism* (1871); *Diseases of the Nervous System* (1871); *Insanity in Its Relations to Crime* (1873); *Mental Work and Emotional Disturbances* (1878); *Cerebral Hyperæmia* (1895); *Fasting Girls* (1879); *Sexual Impotence in the Male* (2d ed. 1885); *Treatise on Insanity* (2d ed. 1883), and several novels.

HAMMURABI, hä'mōō-rä'bĭ. King of Babylonia (c.2240-2185 B.C.). The dynasty to which he belonged seems to have been of Canaanitish origin. It began to reign over Babylonia B.C. 2379. Probably in the time of Hammurabi's grandfather, Apil Sin, while Sin-idinnam ruled in Larsam, an invasion of Babylonia by the Elamite Kuturnachunta took place. The date of this event is known from the statement by Asshurbanipal (B.C. 668-626) that he brought back from Susa the statue of Nana which an Elamitish king had captured 1635 years before. The conquest therefore occurred in B.C. 2285. One of Kuturnachunta's successors, Simti-Shilchak, made his son, Kutur-mabuk, lord of Yamutbal. He became a great conqueror, putting an end to Sin-idinnam's power in Larsam and apparently taking possession of Syria. His son, Rim Sin, was made viceroy in Larsam; Sin-muballat, Hammurabi's father, was driven out of Ishin. But Hammurabi himself was finally successful in expelling the Elamites, and, as recently discovered inscriptions show, extending his own power so far as to include Susa itself. He was thus a great conqueror and builder of a large empire. Yet it is as an organizer of this empire that he has become particularly famous. He not only ruled over a realm that seems to have extended from the Mediterranean into the mountains of Susiana, from the foot of the mountains of Kurdistan to the Persian Gulf, but he wisely cared for the inner development of his kingdom and established it by law. In his inscriptions he records especially the building of a large canal to bring the water of the overflow into the land of Shumir and Akkad. He also erected a great granary for the storing of wheat against times of famine. And there are numerous accounts of his building operations in the extension of temples and palaces. The social life of Babylonia in the time of Hammurabi has long been known more intimately than that of any other period of its history, thanks to the great number of contract-tablets, deeds, testaments, bills of sale, and the like that have been found. A discovery recently made by De Morgan throws an interesting light upon the laws which were recognized in the empire. A great stele, giving in 44 columns 280 edicts, was found in Susa. These laws, probably intended to be enforced in the conquered province, deal minutely with the various situations in life that must be considered in the administration of justice, and show Hammurabi to have been a wise legislator, as well as a great conqueror and administrator. This code of Hammurabi was probably followed in Syria, as well as in Susiana and in Babylonia, and it is therefore natural that many of the statutes should remind of those which found embodiment from time to time in the law codes of Israel. Consult: Winckler, *Geschichte Babyloniens und Assyriens* (Leipzig, 1892); Maspéro, *Histoire ancienne: les premières mêlées* (Paris, 1897); Rogers, *A History of Babylonia and Assyria* (New York, 1900); King, *Letters and Inscriptions of Hammurabi* (London, 1898); Winckler, *Der alte Orient*, Heft 4 (Leipzig, 1902).

HAMON, ä'môn', JEAN LOUIS (1821-74). A French genre painter. He was born at Saint Loup, near Plouha, in northern Brittany, March 5, 1821. He was educated for the priesthood, but his artistic temperament carried him to Paris, where he studied painting with Delaroche and Gleyre. He exhibited the "Tomb of Christ" in the Salon of 1848, "Equality in the Harem" in 1849, and a "Roman Poster" in 1850. In 1849 he found employment in the porcelain manufactory at Sèvres, in which work he was very successful. His enameled casket, exhibited at the London Exposition of 1851, took a medal. His "Human Comedy" (1852), and the celebrated "Ma sœur n'y est pas" ("My Sister is Not at Home") made his reputation; the latter was purchased by Napoleon III. At the Paris Exposition of 1855 he received a second-class medal and the ribbon of the Legion of Honor. In 1862 he went to Rome, and in 1865 he established himself at Capri. The last years of his life were spent at Saint Raphael (Provence), on the Mediterranean, where he died May 29, 1874.

Hamon belonged to the 'Neo-grec' or Pompeian School. His art is the logical development of that of Ingres and Gleyre; it represents modern ideas in a classical garb. It is delicate and mythical, and graceful in execution, but without real life. The Luxembourg and the Museum of Marseilles possess examples of his work, and there are several in America. Among his later subjects are: "The Muses at Pompeii" (1866); "The Promenade" (1867); and "Le triste rivage" (the "Sad Shore"), his last work, exhibited in 1873. Consult La Fenestre, "Hamon," in *L'Art*, vol. ii. (1875).

HAMP'DEN, JOHN (1594-1643). An English statesman and patriot. He was born in 1594, the eldest son of William Hampden, of Great Hampden, Buckinghamshire, and Elizabeth, daughter of Sir Henry Cromwell, of Hinchingbrooke, Huntingdonshire, aunt of Oliver Cromwell. In 1610 he was entered a gentleman commoner at Magdalen College, Oxford, and in 1613

was admitted to the Inner Temple, where he made considerable progress in the study of law. On January 30, 1621, he first entered the House of Commons as a member for Grampound. He attached himself to the party of Saint John, Selden, Coke, Pym, and those who opposed the arbitrary encroachments of the Crown; but at first took no very forward part in public business, and spoke but seldom. In the first three Parliaments of Charles I. he sat for Wendover. In 1627, for refusing to pay his proportion of the general loan which the King attempted to raise on his own authority, Hampden was imprisoned in Hampshire for nearly a year. His uncle, Sir Edmund Hampden, with whom he is sometimes confused, was one of the five knights who sued for liberty on a writ of *habeas corpus* in the famous Five Knights case. The prisoners were all set free when Charles found it necessary to summon his third Parliament. Hampden's industry in Parliament now rendered him one of its leading and most useful members; he was on most of its committees; but after the dissolution of the Parliament of 1628-29 he retired to his estate and devoted himself to study, and country sports and occupations. In 1634 Charles had recourse to the impost of ship money, claiming that it was not a tax, but a commutation for the military service, which every one owed. At first limited to London and the maritime towns, and levied only in time of war, it was in 1635 extended to inland counties in time of peace, when Hampden resolutely refused to pay it, and his example was followed by nearly the whole County of Buckingham. In 1637 he was prosecuted before the Court of Exchequer for non-payment, when a majority of the judges gave a verdict against him. The moral victory, however, was clearly with Hampden. In the Short Parliament of 1640 Hampden took a prominent part in the great contest between the Crown and the House of Commons. To the Long Parliament he was returned for both Wendover and the County of Buckingham, and made his election for the latter. For his resistance to the King's proceedings, he was one of the five members whom Charles, on January 4, 1642, rashly attempted in person to seize in the House of Commons. On the breaking out of the Civil War he raised and became colonel of a regiment in the Parliamentary Army under the Earl of Essex. He was also a member of the Committee of Public Safety. He was an excellent soldier, and constantly urged Essex to a more energetic conduct of the campaign. Some of his reputed victories over the Royalists, however, as at Aylesbury and Reading, are unhistorical. Prince Rupert having attacked a Parliamentary force at Chinnor, near Thame, Hampden joined a small body of cavalry that was rallied in haste to oppose him, and in the fight that ensued at Chalgrove Field received in the first charge a wound of which he died six days later, on June 24, 1643.

See Anthony à Wood, *Athenæ Oxonienses*, vol. iii. (Oxford, 1813-20); Clarendon's *History of the Rebellion* (6 vols., Oxford, 1888); Lord Nugent, *Memorials of John Hampden* (2 vols., London, 1832), with letters; Macaulay's essay on *Lord Nugent's Memorials of Hampden* (New York, 1861); John Forster, *Life*, in "Eminent English Statesmen," vol. iii. (London, 1837); id., *Arrest of the Five Members* (London, 1860); id., *Debates on the Grand Remonstrance* (London, 1860); id., *Sir John Eliot* (2 vols., London, 1864); S. R. Gardiner, *History of England, 1603-42* (10 vols., London and New York, 1883-84); and his *Great Civil War* (4 vols., London and New York, 1893).

HAMPDEN, John (c.1656-96). An English politician, grandson and namesake of the famous statesman. By 1679 he represented his native county, Buckingham, in Parliament, but made no great sensation there, and became known more as a partisan than as a debater, while his long sojourns in France developed free-thinking tendencies. On suspicion of being implicated in the Rye House Plot, he was imprisoned in the Tower (1683), tried and condemned to death, but saved himself by appealing to the King's mercy and revealing even more than he knew. He thus lost caste with his own party, and when it gained the ascendency at the accession of William III. Hampden did not receive the honors nor the position he expected. He was defeated when he ran for Parliament, and turning despondent, committed suicide.

HAMPDEN, Renn Dickson (1793-1868). Bishop of Hereford. He was born in Barbadoes, March 29, 1793, and educated at Oxford. Having left the university in 1816, he held different curacies, and in 1827 published *An Essay on the Philosophical Evidence of Christianity*, followed by a volume of *Parochial Sermons Illustrative of the Importance of the Revelation of God in Jesus Christ*. In 1829 he returned to Oxford and was tutor at Oriel (1832), after having twice acted as public examiner in classics. He was selected to preach the Bampton Lectures in 1832, when he chose for his subject *The Scholastic Philosophy Considered in Its Relation to Christian Theology* (London, 1833). Notwithstanding a charge of Arianism, he became principal of Saint Mary's Hall (1833), and professor of moral philosophy (1834), and in 1836 regius professor of divinity. There resulted a widespread and violent, though ephemeral, controversy, his opponents objecting to certain of his views placing the authority of the Scriptures higher than that of the Church. Later he published a *Lecture on Tradition* (1839; 5th ed. 1842), and a lecture on *The Thirty-nine Articles of the Church of England* (1842). His nomination by Lord John Russell to the vacant See of Hereford, in December, 1847, was again the signal for a violent and organized opposition, and his consecration in March, 1848, took place in spite of a remonstrance by many of the bishops and the resistance of Dr. Merewether, the Dean of Hereford. Among the more important of his later writings were the articles on "Aristotle," "Plato," and "Socrates," contributed to the eighth edition of the *Encyclopædia Britannica*, and afterwards reprinted with additions under the title of *The Fathers of Greek Philosophy* (Edinburgh, 1862). He died in London, April 23, 1868. Consult his life by his daughter (London, 1871).

HAMPDEN, Richard (1631-95). An English statesman. He was the second son of the famous John Hampden (q.v.), and at the age of twenty-five entered political life as member for Buckinghamshire. As an ardent supporter of Cromwell Hampden had a seat in Parliament until the end of the Protectorate, and afterwards during a considerable part of the reigns of Charles II. and James II. Inheriting the politi-

cal principles and sterling character of his father, he resisted the Stuart encroachments upon popular rights, and his fear of the religious consequences led him to advocate earnestly the measure for excluding the Duke of York, afterwards James II., from the throne. In the Parliamentary deliberations in 1689, which ended in the call of William, Prince of Orange, to the British throne, Hampden bore an important part, and upon the establishment of the new dynasty was rewarded with responsible appointments. He was made Privy Councilor, a Commissioner of the Treasury, and finally Chancellor of the Exchequer in 1690.

HAMPDEN-SIDNEY COLLEGE. A college situated near Farmville, Prince Edward County, Va.; founded in 1776, and chartered in 1783. It is under Presbyterian auspices, but is nonsectarian. It offers courses leading to the degrees of Bachelor of Arts, Bachelor of Science, and Bachelor of Literature. The attendance averages 100. The college has buildings and grounds valued at $225,000, productive funds amounting to $150,000, and an income of $13,000. The library contains some 16,000 volumes. Among its early trustees were Patrick Henry and James Madison, and among its presidents Rev. John Blair Smith, afterwards first president of Union College, New York, and Rev. Archibald Alexander, afterwards founder of Princeton Theological Seminary.

HAM'POLE, Richard, Rolle of. See Rolle, Richard.

HAMP'SHIRE, Southampton, or familiarly Hants. A maritime county in the south of England, bounded on the west by Dorsetshire and Wiltshire, on the north by Berkshire, on the east by Surrey and Sussex, and on the south by the English Channel (Map: England, E 5). Area, including Isle of Wight, 1622 square miles. The surface is irregular, being traversed by the North and South Downs. The principal rivers are the Anton or Test, the Itchen, and the Avon. The climate of the country is in general mild and favorable to vegetation; the climate in the south of the Isle of Wight is milder than that of any other portion of Great Britain. Hops are cultivated, and the bacon cured here is famous. Vegetable gardening is an important pursuit. Southampton and Portsmouth, both termini of important railways, are the chief centres of trade, while Winchester is the capital. The New Forest is an extensive tract in the southwest of the county. Hampshire contains many interesting relics of the early ages of English history. Of these the chief is Porchester Castle, on Portsmouth Harbor, Population, in 1901, 798,756. Consult Shore, *History of Hampshire* (Southampton, 1892).

HAMP'STEAD. A metropolitan borough of London, in Middlesex, England, 4 miles northwest of Saint Paul's Cathedral (Map: London, D 6). The borough has an area of 3½ square miles, over 15 per cent. of which is devoted to the finest open public grounds of the metropolis. Hampstead is the seat of several benevolent and other metropolitan institutions, has one of the finest of London town halls, municipal electric lighting, baths, and public library. It is situated on a range of hills that reach their greatest altitude of 443 feet in Hampstead Heath, which commands extensive views. It was formerly a village celebrated for its mineral springs as far back as the Roman period, and many valuable archæological finds have been made here. From early times it has been a favorite residential section, with numerous elegant mansions and villas of Londoners. It has interesting artistic and literary associations of Pope, Addison, Gay, Johnson, Byron, Keats, Leigh Hunt, Joanna Baillie, Constable, Du Maurier, and others. Hampstead Heath, with an area of 240 acres, and Parliament Hill, on the southeast with 265 acres, acquired by the London Board of Works since 1870 as public grounds, are popular and greatly frequented resorts on Sundays and holidays. Population, in 1891, 68,126; in 1901, 81,942. Consult Baines, *Records of Hampstead* (London, 1890); White, *Sweet Hampstead* (London, 1901).

HAMP'TON. A city and the county-seat of Franklin County, Iowa, 59 miles north by west of Marshalltown; on the Iowa Central and the Chicago Great Western railroads (Map: Iowa, D 2). It has a fine court-house and a public park. The city is the centre of an agricultural and stock-raising district, and is an important market for horses. Population, in 1890, 2067; in 1900, 2727.

HAMPTON. A town and the county-seat of Elizabeth City County, Va., on the north side of Hampton Roads, 2½ miles northwest of Fortress Monroe and 16 miles north by west of Norfolk; on the Chesapeake and Ohio Railroad (Map: Virginia, H 4). It is a popular resort, with good bathing facilities; and has considerable trade in agricultural produce, fish, oysters, and canned crabs. The town is the seat of the Hampton Normal and Agricultural Institute, and has the Church of Saint John (Protestant Episcopal), built in 1660, a National Soldiers' Home, with 2000 inmates, and a National Cemetery where 3323 bodies are interred, 600 of unknown dead. The government is administered under a charter of 1887 by a mayor, elected every two years, and a unicameral council. Population, in 1890, 2513; in 1900, 3521. Hampton was settled (before 1610) on the site of an old Indian village, Kiquotan, and for many years was known by that name. It was one of the original boroughs represented in 1619 in the first Virginia Legislature. During the Revolution and the War of 1812 it suffered by fire at the hands of the English, and again in August, 1861, it was burned by a Confederate force under General Magruder.

HAMPTON, John Somerset Pakington, Baron (1799-1880). An English statesman, born in Worcestershire. His father was William Russell, but he adopted his mother's name, Pakington, upon inheriting estates from her family. He received his education at Eton and Oxford, but took no degrees, and entered Parliament in 1837. In 1852 he was Colonial and War Secretary under Lord Derby, First Lord of the Admiralty in 1859, and was again appointed to the same position in 1866, when his party returned to power. He was War Secretary under Disraeli, and was made a baron in 1875. His Parliamentary labors tended toward advancement in education and freedom in religion.

HAMPTON, Wade (1754-1835). An American soldier and planter, grandfather of Gen. Wade Hampton (1818-1902). He served with distinction under Marion and Sumter in the Revolutionary War, but, as McMaster says in his *History of the People of the United States*

(vol. iv., p. 49), he "was another of that small class of officers who, after serving with credit in the War for Independence, fought with discredit in the War of 1812." Not only did he show no ability during the disastrous campaign in which he took part as major-general in Wilkinson's army, but he helped to render abortive the projected invasion of Canada in 1813 by the enmity which he displayed toward his superior. The next year he resigned his commission, and returned to South Carolina, where he became one of the wealthiest planters in the State. He was twice elected to Congress, once in 1794 and again in 1802.

HAMPTON, Wade (1818-1902). An American soldier and politician, the third of that name, born at Columbia, S. C., the son of one of the wealthiest planters in the South. He studied law at the University of South Carolina, but instead of practicing gave all his time to the management of his extensive estates. Although a Democrat in politics, he belonged to the Union rather than the States Rights wing of the party, a fact which shut him out from political preferment in a State where radicalism was so rife as it was in South Carolina. With the secession of his State from the Union, however, he entered enthusiastically into the movement for the establishment of the Confederacy, and early raised and equipped from his private means the command which, under the name of 'Hampton's Legion,' did good service for the Confederate cause throughout the war. At the head of these troops Hampton participated in the first battle of Bull Run and in the Peninsular campaign, was wounded at Fair Oaks, and soon afterwards was commissioned brigadier-general of cavalry. He took part in Lee's northward advance in 1863, was thrice wounded at Gettysburg, and was promoted major-general on August 3d following. He was engaged in opposing the advance of Sheridan in the Shenandoah Valley in 1864, where he showed such high qualities as a cavalry commander that he was in August of that year commissioned lieutenant-general and placed in command of all Lee's cavalry. Later he commanded the cavalry in Johnston's army, which opposed Sherman's advance from Savannah in 1865. After the war he entered enthusiastically into the work of building up the South and reconciling its citizens to the outcome of the struggle. In 1876 he was nominated by the Democrats for Governor, and after successfully contesting the election with his Republican opponent, Daniel H. Chamberlain, he served until 1878, when he was elected to the United States Senate. There he served by reëlection until 1891, when his opposition to the Populistic tendencies of the Tillman Democracy in his native State led to his retirement. From 1893 to 1897 he was United States Commissioner of Railroads, to which office he was appointed by President Cleveland.

HAMPTON COURT. An English royal palace, situated amid extensive pleasure grounds, on the north bank of the Thames, one mile from the village of Hampton and about 15 miles west-southwest of London. It dates from 1515, when it was built for Cardinal Wolsey, who presented it to Henry VIII. The palace is built of red brick with stone facings, and consists of three quadrangles, with some smaller courts. The great eastern and southern fronts were built from designs by Sir Christopher Wren, for William III. In the palace Edward VI. was born, Queen Jane Seymour died, and Charles I. was imprisoned. It was the occasional residence of Cromwell, and was a favorite periodical residence of the sovereigns until the reign of George II. It contains one thousand rooms, eight hundred of which in suites are now occupied by needy persons of rank in favor with the King. There is a famous picture gallery, with a valuable collection of old masters. The gardens cover 44 acres of land; one of the most notable features is the labyrinthine maze. The palace and grounds are opened daily to the public, free of charge, and constitute a popular holiday resort of the Londoners. Consult Law, *Hampton Court in Tudor, Stuart, Orange, and Guelph Times* (3 vols., London, 1885-91).

HAMPTON COURT CONFERENCE. A conference at Hampton Court, shortly after the accession of James I. to the throne of England, for the discussion of religious differences. The King presided, and was supported by Archbishop Whitgift, with eight bishops, seven deans, and two other clergymen. The Puritan party, whose demands were under consideration, were represented by four eminent clergymen of moderate views. These demands had been presented to the King in the previous year in what is known as the Millenary Petition, because it was intended to be signed by one thousand Puritan clergymen, though in fact it seems not to have been done, about seven hundred and fifty clergymen having probably signified their adherence by letter. It disclaimed schism, and, unlike former demands of the Puritan party, carefully refrained from attacking episcopacy, restricting its prayers to a purification of the ritual and the encouragement of preaching as an essential part of the service, together with greater latitude of belief for those clergymen who objected to subscribing to the whole of the Prayer-Book; and, lastly, to the reform of a few enumerated abuses, principally in matters of discipline.

There were three sessions of the Conference—on January 14th, 16th, and 18th. The petitioners were admitted to the second, in which James preserved an appearance of impartiality until the unfortunate use of the word 'presbyter' threw him into a passion, and he left the room with the declaration: "I shall make them conform themselves, or I will harry them out of the land, or else do worse." On the third day the King's decision, save for a few points entirely adverse to the petitioners, was announced in indecorously harsh language. This marks the beginning of the close connection between the bishops and the House of Stuart, and the alienation of the Puritan party.

The Millenary Petition is printed in Prothero, *Statutes and Constitutional Documents, 1559-1625*, p. 413 (Oxford, 1894), together with a few documents bearing upon the Conference. The Petition and James's proclamation for the use of the Prayer-Book are also to be found in Gee and Hardy, *Documents Illustrative of English Church History* (London, 1896). See also Gardiner, *History of England, 1603-42* (London and New York, 1883-84), i. 146.

HAMPTON NORMAL AND AGRICULTURAL INSTITUTE. An institution for the education of negroes and Indians, situated on

a plantation of 185 acres on the Hampton River, Virginia, two miles from Old Point Comfort. The school was opened in 1868 under the auspices of the American Missionary Association, with Gen. S. C. Armstrong in charge. In 1870 it received a charter from the State. It is a private corporation, administered by a board of 17 trustees of different denominations. The school has 55 buildings, including, besides dormitories and recitation-halls, a library with 11,000 volumes, a church, a hospital, gymnasium, sawmill, planing-mill, various shops, a well-equipped trade school, and a large building for domestic science and agriculture. The instruction comprises academic, trade, agricultural, domestic science, and normal courses. The Armstrong and Slater Memorial Trade School, opened in 1896, gives training in the theory and practice of carpentry, painting, blacksmithing, tailoring, and other handicrafts. The girls are instructed in housework, laundry-work, cooking, sewing, upholstery, and other home and farm occupations. A farm with barn and stock, greenhouses, and experiment station furnishes work and instruction for agricultural students. Five miles from the school is another farm of 600 acres, largely for stock, also worked by students. The expenses of tuition are met by contributions; but in pursuance of the school's policy to foster independence in the students, those who are unable to pay their board are required to make a return in labor. The young men are under military discipline, and are organized in a battalion of six companies. The school publishes a monthly paper, the *Southern Workman*, devoted to matters relating to the two races, and printed, as is all other school literature, by the students' printing department. In 1902 the school had 80 instructors and an attendance of 1079, of whom about 110 were Indians. The day school is closed from June to October, but the industrial departments continue through the summer. A normal institute is carried on during six weeks in the summer for the colored teachers of the South. Between four and five hundred attend. The institute has graduated over 1100 students, of whom 60 per cent. are engaged in teaching. At least 6000 undergraduates have gone out from the school. Of the colored students who have finished their trade studies since 1885, about 80 per cent. are either teaching trades or working at them. Many former students of both races are successful farmers or engaged in various business enterprises, while a limited number have fitted themselves for professional careers. The most noted graduate is Booker T. Washington (q.v.), of the class of 1875. The endowment of Hampton is nearly $1,100,000, and the annual income of about $165,000 is received from endowments, from the State land scrip and agricultural funds, from the Government Indian funds, from the Slater and Peabody funds, and from private benefactions, mostly in the form of scholarships.

HAMPTON ROADS. The lower part of the estuary of the James River, Virginia, where it falls into Chesapeake Bay (Map: Virginia, H 5). It is an important military point, and is defended by Forts Wool and Monroe. Its channel is broad and deep, and the harbors along its shores, especially that of Norfolk, are excellent. This fact, together with the number of railroad lines which terminate at Norfolk and other points on its shores, gives it a considerable commercial importance. During the Civil War there were two naval engagements in and near Hampton Roads. On March 8, 1862, the frigate *Congress*, the sloop-of war *Cumberland*, the steam frigates *Minnesota* and *Roanoke*, and the ship *Saint Lawrence* were in the roadstead, when the *Virginia*, an iron-clad Confederate craft, formerly the United States steam frigate *Merrimac*, which had been seized the year before, attended by two small steamers, came from Norfolk, passed rapidly by the *Congress*, exchanging broadsides, and ran directly into the *Cumberland*, which sank in less than three-quarters of an hour. The *Congress* was disabled and set on fire, and eight hours later her magazine exploded. The other Union vessels escaped. The Union loss was 286; that of the Confederates only about a dozen. On the following day the famous contest occurred in the Roads between the Federal *Monitor* and the *Virginia*. See MONITOR.

HAMPTON ROADS CONFERENCE. In American history, an informal conference, with reference to the arrangement of a peace between the North and South, held on a vessel, the *River Queen*, near Fort Monroe, February 3, 1865, toward the close of the Civil War, between President Lincoln and Secretary of State Seward, representing the United States Government, and Vice-President Alexander H. Stephens, Senator Robert M. T. Hunter, and Assistant Secretary of War John A. Campbell, representing the Confederate States. The conference was brought about primarily by Francis P. Blair (q.v.), who conceived that the war might be closed and the two sections of the country reunited by arranging for joint action on the part of the Federal and Confederate armies against Maximilian in Mexico, with a view to the enforcement of the Monroe Doctrine and the possible absorption of Mexico by the United States, the Southern States to agree, however, to the complete abolition of slavery within their boundaries. President Lincoln refused to consent to such a conference except on the basis of union, and the Southern commissioners somewhat equivocally acceded to his terms. During the conference, which lasted for four hours, President Lincoln expressed himself in favor of the admission of the Southern States, after their surrender, to immediate representation in Congress, and stated that in regard to the confiscation acts he should "exercise the power of the executive with the utmost liberality," but that he would never modify to the slightest extent the Emancipation Proclamation, though "if the war should then cease, with the voluntary abolition of slavery by the States," he should, personally, favor the payment by the Federal Government of a fair indemnity to the former slave-owners. He disapproved, however, of the project for a joint attack upon the French in Mexico, and refused to consent to any treaty with the Confederate Government as such, or to consider any proposition for peace which did not provide for the complete restoration of the Union. The conference broke up without any agreement having been reached, and the Confederate commissioners immediately returned to Richmond. Consult: Nicolay and Hay, *Abraham Lincoln: A History*, vol. x. (New York, 1890); A. H. Stephens, *The War Between the States*, vol. ii. (Philadelphia, c.1868-70); and

Davis, *Rise and Fall of the Confederate Government*, vol. ii. (New York, 1881).

HAM'STER (Ger., from OHG. *hamstero*, weevil; possibly borrowed from Lith. *staras*, hamster). A burrowing gregarious rodent of the Old World, representing a subfamily (Cricetinæ) of the mice (Muridæ), and having the troublesome habits of the North American gophers. The group is characterized by the tuberculous crowns of the molar teeth, by the extensive cheek-pouches, and by the short, hairy tail. The hamster (*Cricetus vulgaris*) is a native of the north of Europe and of Asia, and is abundant in many parts of Germany and Poland, but rare west of the Rhine. It is of variable color, usually reddish-gray above, the belly black, the feet white, and large white spots on the sides, throat, and breast. It is larger and of stouter form than the common rat, with the tail only about three inches long. It burrows in dry soils, each individual making a burrow for itself, to which there are more entrances than one, and which also contains several holes or compartments, one of them lined with straw or hay, in which the animal sleeps. Some of the chambers are capacious enough for the storing of large quantities of seeds or other provisions, even to the amount of 60 or 100 pounds of grain or beans, which the animal carries thither in its cheek-pouches, and on which it feeds during the milder parts of winter, spending the most severe part of that season in a state of torpid hibernation. It is a great pest to the farmers, and the object of their unceasing hostility; but it is very prolific, and produces two or three broods in the year, 16 to 18 at a birth. This leads, occasionally, to their appearing in countless swarms, overrunning the fields in migrating hordes which form a devastating plague until gathering enemies and disease kill them off. The hamster feeds generally on vegetable food, as leaves, seeds, and the like, and is said also to devour small quadrupeds, birds, frogs, etc. It is a fierce and pugnacious animal, and exhibits more than the pertinacity of the bulldog. The skins of hamsters are of some value. There are several other smaller species of the genus, mostly Asiatic, and two other genera in the subfamily, both African.

HAN. A Chinese dynasty. It was founded by one Liu Pang, a soldier of fortune (born B.C. 247, died B.C. 195), who rebelled, took to soldiering, became Duke of P'ei, later Prince of Han, and after much fighting and many adventures became the acknowledged Emperor of the country, and mounted the throne about B.C. 206. The capital was at Chang-an (now Si-ngan-fu in Shen-si); but later, in the reign of the fifteenth Emperor (A.D. 25), it was changed to Lo-yang in Ho-nan. Hence the division of the dynasty into Western or Former, and Eastern or Later Han. It came to an end in A.D. 220, when the Empire became divided into 'Three Kingdoms,' one of which is known as the Minor Han (A.D. 221-264). In all fourteen emperors ruled during the Former Han, twelve during the Later, and two during the Minor Han.

One of the first acts of Kao-ti, its founder, was to abolish the tyrannical laws of his predecessors, and to establish a new code characterized by moderation and justice, and in the reign of his successors literature began to revive. In B.C. 91 appeared the first general history of the country, from the pen of Sze-ma Ts'ien, the Herodotus of China, whose works covered the period from 2697 to B.C. 104. Two hundred and twelve years later appeared the great dictionary of Hiu Shin, in which all the words in Chinese literature—about ten thousand in all—are defined and explained. Early in the dynasty the Jews entered China and established a colony in Ho-nan (see KAI-FUNG), and in B.C. 121 silk was introduced into Europe. In A.D. 67 Buddhism entered China under Imperial auspices, and Taoism, under the influence of the new cult, began to take on its present forms. The practice of burying slaves with the dead was abolished and clay figures used instead, and it would appear that marionettes were invented during this dynasty. Though not without internal troubles at times, and a usurpation that threatened the continuity of succession, the Han period was one of increasing prosperity and advancing civilization and culture. Consult: Williams, *Middle Kingdom* (New York, 1883); and Giles, *Historic China* (London, 1882). See CHINESE EMPIRE.

HAN'AFORD, PHEBE ANNE (COFFIN) (1829—). A Universalist minister and author, born on the island of Nantucket. She was brought up a Quaker. She was married in 1849; was ordained a minister in 1868, and has preached with success in Massachusetts, at New Haven, and at Jersey City, and on several occasions has performed the duties of chaplain to the Legislature of Connecticut. She has also been conspicuous in temperance work. She has been a voluminous writer, having published poems, essays, addresses, stories, and lives of *Abraham Lincoln* (1865), of *George Peabody* (1870), and of *Charles Dickens* (1870). Other works include *Leonette, or Truth Sought and Found* (1857); *The Soldier's Daughter* (1866); *The Young Captain* (1868); and *From Shore to Shore, and Other Poems* (1870).

HANAU, hä'nou. The capital of a circle in Hesse-Nassau, Prussia, situated at the junction of the Kinzig with the Main, 12 miles east of Frankfort (Map: Prussia, C 3). The newer portion of Hanau was founded in 1597 by Walloons and Protestants from the Netherlands, and with this date begins the town's industrial development. The most notable buildings are the castle, formerly the residence of the counts of Hesse-Philippsthal and now owned by the city; the old Church of Saint Mary, mentioned at the beginning of the fourteenth century; the seventeenth-century Church of Saint John; the two ancient town halls, dating from the fifteenth and sixteenth centuries respectively; the seventeenth-century town hall, the theatre, and the house formerly occupied by the brothers Grimm, natives of Hanau. Hanau is an important industrial centre, and is noted for its gold and silver ware. There are also manufactures of tobacco, cigars, gloves, carpets, paper, knit ware, machinery, and chemicals. Hanau has, near by, one of the largest powder-factories in the world. There is a considerable trade in local manufactures, agricultural products, and lumber. The town possesses canal communication, and is well equipped with advanced schools and the most modern improvements. In the vicinity are situated the fine palace of Philippsruhe and the bathing resort of Wilhelmsbad, with its iron springs. Population, in 1890, 25,029; in 1900, 29,846, mostly Protestants.

Hanau is believed to have had its origin in a Roman settlement. It was raised to the rank of a city early in the fourteenth century, and was fortified in 1528. During the Thirty Years' War it was occupied repeatedly by the Swedes and the Imperial troops, and it was the scene of the last battle fought by Napoleon on German soil. This conflict, which took place on the 30th and 31st of October, 1813, resulted in the severe defeat of the allied armies under Wrede.

HAN'BURY, BENJAMIN (1778-1864). An English Nonconformist historian, born at Wolverhampton. He was employed in the Bank of England from 1803 to 1859. He devoted himself to collecting documents bearing on all Nonconformist matters, and took the most lively interest in the promotion of the cause. His works include: *An Historical Research Concerning the Most Ancient Congregational Church in England . . .* (1820); *Historical Memorials Relating to the Independents . . .* (1839); and *A Life of Calvin* (1831).

HAN'COCK. A village in Houghton County, Mich., opposite Houghton; on Lake Portage and on the Duluth, South Shore and Atlantic Railroad (Map: Michigan, E 1). A ship canal to Lake Superior affords transportation facilities also by water. Hancock is in the centre of the Lake Superior copper region, and besides several highly productive copper-mines has smelting-works, foundries and machine-shops, and other industrial establishments. Montezuma Park and a Finnish college are among the features of the village. It was settled in 1859, and in 1863 was incorporated. Under a charter of 1895 the government is vested in a president, chosen annually, and a village council, elected on a general ticket. The water-works are owned and operated by the municipality. Population, in 1890, 1772; in 1900, 4050.

HANCOCK, JOHN (1737-93). An American patriot of the Revolutionary period, president of the Continental Congress, a signer of the Declaration of Independence, and the first Governor of the State of Massachusetts. He was born at Braintree, Mass., January 23, 1737, graduated at Harvard in 1754, and was adopted by an uncle, Thomas Hancock, who in 1764 left him a fortune of about £80,000, and to whose large mercantile business he succeeded. After his graduation he spent some time in England. He was for several years one of the selectmen of Boston, and after 1766 was repeatedly elected to the Massachusetts General Court, where he steadily resisted the encroachments of the British Ministry. After the 'Boston Massacre' (q.v.) in 1770, Hancock was a member of the committee which was appointed by the people of Boston to demand of Governor Hutchinson the removal of the British troops from Boston, and on the fourth anniversary of the 'massacre' he delivered the customary commemorative oration, and by his boldness and eloquence attracted attention to himself anew as one of the leaders of the Patriot or Whig Party. In June, 1774, he was appointed by the General Court, of which he was a member, one of the representatives of Massachusetts in the first Continental Congress, and in October he was appointed chairman (later president) of the first Provincial Congress of Massachusetts, which adjourned on December 10th. He was likewise president of the second Provincial Congress, which assembled at Cambridge in February of the following year, and by his activity in this and other extra-legal proceedings incurred, with Samuel Adams, the bitter hostility of Governor Gage, whose expedition to Lexington and Concord on April 18th-19th (see LEXINGTON) was sent out in part to secure the capture of these two leaders, and who, when issuing his proclamation of pardon on June 12th, expressly excepted Hancock and Adams, "whose offenses," he said, "are of too flagitious a nature to admit of any other consideration than that of condign punishment." In defiance of the known hostility toward Hancock of the British Ministry, and partly, no doubt, with a view to winning over members of the wealthier and more aristocratic families in New England, who as a class were inclined to conservatism, and were disposed to remain loyal to the home Government, Hancock was elected president of the Continental Congress in May, 1775. Though he resigned this position in October, 1777, he remained a member of the Congress until 1780, and served again in that body in 1785-86. In 1778, as major-general of Massachusetts militia, he commanded the State troops in the Rhode Island expedition. In 1780 he was a member of the Constitutional Convention of Massachusetts, and upon the adoption of the Constitution there framed was elected first Governor of the State, in which position he was retained by annual reëlections until 1785. After an intermission of two years he was again Governor from 1787 until his death. Though at first thought to be opposed to the Federal Constitution as drawn up by the convention at Philadelphia in 1787, he presided over the Massachusetts convention which ratified that document in 1788, and used his influence to win over those who favored rejection. Concerning Hancock's character and the extent of his influence there has been much difference of opinion among historical writers; but he is now generally considered to have been a man of undoubted patriotism and of considerable ability, whose usefulness at times was impaired by his vanity and his jealous disposition. There is no adequate biography of Hancock, but considerable material bearing upon his life may be found in Abraham E. Brown, *John Hancock, His Book* (Boston, 1898).

HANCOCK, WINFIELD SCOTT (1824-86). A distinguished American soldier, born February 14, 1824, at Montgomery Square, Montgomery County, Pa. He graduated at West Point, June 30, 1844, number eighteen in a class of twenty-five, and was assigned, July 1, 1844, as a brevet second lieutenant to the Sixth Infantry, with which he served for two years in the Indian country. He was appointed second lieutenant in the same regiment in June, 1846. In the Mexican War he commanded a company at the National Bridge (August 12, 1847), and subsequently earned the brevet of first lieutenant "for gallant and meritorious conduct at Contreras and Churubusco." From 1848 to 1855 he served successively as regimental adjutant and quartermaster, and for a short time as assistant adjutant-general, Department of the West. Having shown great aptitude in all staff details, he was appointed captain and assistant quartermaster in November, 1855, and was assigned to duty in Florida. He accompanied General Harney to Kansas, serving during the

border troubles there, and in 1855 was ordered to proceed to Utah, arriving at Fort Bridger with his wagon-train after a march of 700 miles in 26 days. At this point he found his old regiment under orders to march overland to California. He was directed to accompany it, in charge of the transportation. Organizing and equipping a train of 128 wagons, from inferior materials, he conducted it safely over a rough trail of 1100 miles to its destination, at Benicia. From May, 1859, to August, 1861, he was chief quartermaster on the Pacific Coast, with headquarters at Los Angeles.

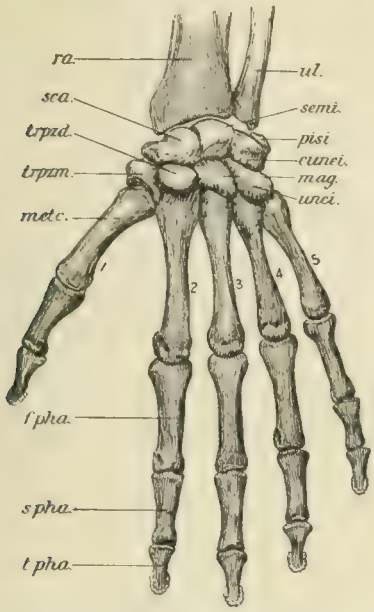
At the outbreak of the Civil War Captain Hancock was among the first to be appointed to the grade of brigadier-general of United States Volunteers, his commission being dated September 23, 1861. Assigned to command a brigade in Smith's Division, Fourth Corps, Army of the Potomac, he first led it in action at Williamsburg, Va. (May 5, 1862), where he earned the mention, in General McClellan's dispatches, that "Hancock was superb." At Antietam, upon the death of General Richardson, he was placed in command of the First Division, Second Corps. In November, 1862, he was promoted to be major-general United States Volunteers. At Fredericksburg, Va., December 13, 1862, his new command suffered a loss of 40 per cent., including 150 officers killed and wounded. The battle of Chancellorsville (May 2-4, 1863) was to a great extent prevented from becoming a total rout of the Federal forces by the steadiness of Hancock's division. Soon afterwards the command of the Second Corps was given to him. On the morning of July 1, 1863, the advance of Lee's army, having encountered the left wing of the Army of the Potomac in front of Gettysburg, was steadily pressing it back, with the loss of its commander, Reynolds. General Meade ordered Hancock to proceed to the battlefield, assume command there, and virtually to decide at his discretion whether the Army of the Potomac should meet the Army of Northern Virginia at that time and place. Hancock arrived on the field at 3.30 P.M., to find the Confederates massing their forces for a farther advance while confronted by the depleted lines of the Federal Army. He quickly infused confidence among the troops, reformed the Federal lines, and in various ways so strengthened his position as to deter General Lee from making his contemplated attack. On the following day, during the nearly successful attempt of Lee to turn the flanks of the Federal Army, Hancock was placed in command of the left wing, and, by judicious handling of his men and gallant personal effort, stemmed the tide of battle. On the third day a Confederate charge was directed against Hancock's command, the Federal centre, and succeeded in penetrating the first line, but was finally repulsed. Each side suffered terrible losses, and Hancock received a wound from which he never entirely recovered. In March, 1864, he resumed command of his corps, which, in the reorganization of the army under Grant, was reënforced by the transfer of two divisions from the Third Corps, making an aggregate strength of 43,055. Hancock was distinguished by the energy, good judgment, and tactical skill displayed in the Wilderness campaign. The unfortunate engagements in front of Petersburg and at Ream's Station were the first occasions in which his command met with reverses. On August 12, 1864, he was promoted to be brigadier-general in the Regular Army, and in November he was placed in command of the Middle Military Division. He received his commission as major-general in the Regular Army on July 26, 1866. He was then sent to command the Department of Missouri, with headquarters at Fort Leavenworth, and during the year 1867 personally led an expedition against the Indians. In August of that year he was sent to New Orleans to supervise the rehabilitation of the States of Louisiana and Texas. In a general order he defined his duty, stating that "crimes and offenses committed in this district must be left to the consideration and judgment of the regular civil tribunals," but added that "armed insurrection or forcible resistance to the law will be instantly suppressed by arms." His conservative course not meeting with the support from the Washington authorities which he expected, he was at his own request relieved, and assigned to command the Military Division of the Atlantic, with headquarters at Governor's Island, where he remained until March, 1869, when he assumed charge of the Department of Dakota. In 1872 he was reassigned to the Division of the Atlantic. While acting in this capacity, General Hancock was in 1880 made the Democratic nominee for President of the United States, but was defeated by his Republican opponent, Garfield. General Hancock died at Governor's Island after a brief illness, on February 9, 1886. In 1850 he married Miss Almira Russell, of Saint Louis, by whom he had two children. Consult: Walker, *General Hancock* (New York, 1894), in the "Great Commander Series;" and id., *History of the Second Corps* (1886).

HANCOCK HOUSE. The former residence in Boston of Governor John Hancock. It was erected in 1737 and taken down in 1863.

HAND (AS., Icel. *hond*, Goth. *handus*, OHG. *hant*, Ger. *Hand;* perhaps connected with Goth. *hinþan*, AS. *hentan*, to seize). The terminal portion of the superior limb of man. It is almost invariably distinguished by name from the same organ in other vertebrate animals; but actually there is little essential difference, and it is legitimate and proper, therefore, to speak of the terminal part of the fore limb of any quadruped as the 'hand' or *manus*, in distinction from the 'foot' or *pes*. We will first consider the human hand, and afterwards its homologue in the lower animals.

"That," says Cuvier, "which constitutes the *hand*, properly so called, is the faculty of opposing the thumb to the other fingers, so as to seize upon the most minute objects—a faculty which is carried to its highest degree of perfection in man, in whom the whole anterior extremity is free, and can be employed in prehension." The peculiar prehensile power of the human hand is chiefly dependent upon the length, power, and mobility of the thumb, which can be brought into exact opposition to the extremities of all the fingers, whether separately or grouped together. The general arrangement of the bones of the arm is similar to that of the leg. The *humerus* or arm-bone corresponds to the *femur* or thigh-bone; the lower end of the humerus is connected with the two bones of the forearm, the *radius* and the *ulna*, which correspond with the two bones of

the leg. Then come the *carpal* bones, the *metacarpal* bones, and the *phalanges*, as we have *tarsal* bones, *metatarsal* bones, and *phalanges* in the foot. We have a diagram showing the way in which the bones of the hand are arranged. The carpal bones are eight in number, and are arranged in the wrist in two rows. The first or upper row consists practically of three bones, the scaphoid, semilunar, and unciform, the fourth, the pisiform, being regarded as belonging to the class of *sesamoid bones* (q.v.), and the second row of four bones, trapezium, trapezoid, os magnum, and unciform; so that, excluding the pisiform bone, the carpal and the tarsal bones correspond in number. As we commonly term the palm the *front* of the hand, the thumb becomes conventionally the *outer*, and the little finger the *inner*, digit; but according to the rules of comparative anatomy, and in order to compare the hand and foot, we ought to reverse these terms. The outer of the carpal bones of the first row supports the bones of the thumb and forefinger, and constitutes with them the *outer* division of the hand. The inner of the carpal bones bears the little and the next (the ring) finger, and constitutes with them the *inner* division of the hand; while the middle one bears the middle finger, and belongs to the *middle* division of the hand. The two outer bones are connected with the radius, while the inner bone is connected (indirectly by a thick ligament) with the ulna.



LEFT HAND (dorsal surface).

ra., radius; *ul.*, ulna; *sca.*, scaphoid; *semi.*, semilunar; *pisi.*, pisiform; *cunei.*, cuneiform; *trpzm.*, trapezium; *trpzd.*, trapezoid; *mag.*, magnum; *unci.*, unciform; *metc.*, metacarpal; *f.pha.*, first phalange; *s.pha.*, second phalange; *t.pha.*, third phalange.

Collectively, the carpal bones are so arranged that the carpus presents a dorsal convex surface, upon which the tendons of the extensor muscles of the fingers play, and a palmar concave surface, on which the tendons of the flexor muscles lie. The several bones are joined to one another—each bone being united to three or more others—by a large extent of surface, and are girded together by strong ligamentous bands. The wrist is thus as strong as if it had been constructed of one solid piece of bone, while the slight gliding movements which occur between the several bones give it an elasticity which serves to break the shocks that result from falls upon the hand. The uppermost surface of the first row of carpal bones is convex, and this convex surface is received into a wide cup or socket, formed by the lower articular surface of the radius, and by a ligament passing from that bone to the ulna. The metacarpal bones and the phalanges require no special description. Like the great toe, the thumb has only two phalanges, while each of the other digits has three.

We shall now notice the various movements of which the hand is capable. They may be divided into (1) the different directions in which the hand collectively can be moved, and (2) the movements of which the hand itself, without reference to the arm, is capable. The *scapula* or shoulder-blade, with which the principal arm bone articulates, is itself movable to a very considerable extent on the surface of the ribs on which it rests. Again, the socket in which the nearly spherical head of the *humerus* or arm-bone lies is very shallow—not unlike the cup in the well-known toy *cup-and-ball*—and the arrangements of the shoulder-joint generally are such as to permit so great a variety and so extensive a range of movements that we are able to apply the hand to every part of the body. This freedom of motion is due in a great degree to the clavicles or collar-bones, which, by steadying the shoulder-blades and keeping the shoulders apart, afford a fixed point for the various muscles which we employ in raising the arms, in folding them over the chest, in the act of hugging, etc. The movement at the next junction of bones, the elbow-joint, is very different from that at the shoulder. The latter is termed, from its construction, a ball-and-socket joint, and admits of motion in all directions within definite limits; while the elbow is a hinge joint, and merely admits of bending and straightening, or, in other words, of motion in one plane. We have next to consider a class of movements of the forearm and hand, to which there is nothing analogous (at least to any material extent) in the leg. The movements in question are called 'pronation and supination.' In *pronation* (from Latin *pronus*, with the face downward), we turn the palm of the hand downward, as in picking up any substance from the table; in *supination* (from Latin *supinus*, with the face upward), we turn the palm upward, as for the purpose of receiving anything that may be placed in it.

These movements of pronation and supination are so important to the usefulness of the hand that we must notice the three muscles by which they are chiefly effected. One of the three muscles passes from a projecting process on the inner side of the arm-bone, at its lower end, to the outer edge of the middle of the radius. Its contraction causes the radius to roll over, or in front of, the ulna. It thus pronates the hand, and is called a *pronator* muscle. Another muscle passes from a projecting process on the other side of the arm-bone to the inner edge of the radius near its upper part. It runs, therefore, in an opposite direction to the former muscle, and

produces an opposite effect, rolling the radius and the hand back into the position of supination. Hence it is called a *supinator* muscle. The third is a very powerful muscle, termed the *biceps* (q.v.), which not only bends the elbow, but, from the mode in which its tendon is inserted into the inner side of the radius, "also rotates the radius so as to supinate the hand; and it gives great power to that movement. When we turn a screw, or drive a gimlet, or draw a cork, we always employ the *supinating* movement of the hand for the purpose; and all screws, gimlets, and implements of the like kind are made to turn in a manner suited to that movement of the right hand, because mechanicians have observed that we have more power to supinate the hand than to pronate it." Supination can only be performed to its full extent by man, and even in man it is not the natural or habitual position; monkeys can partially effect the movement, and in most of the lower animals the part corresponding anatomically to the hand is constantly in a state of pronation.

The movements of which the hand itself, without reference to the arm, is capable, are very numerous, and in this respect differ considerably from the corresponding movements of the foot. Thus we can bend the fingers down upon the palm, or we can extend them beyond the straight line; we can separate them from one another to a considerable extent, and we can close them with considerable force. The wrist and hand are bent forward or flexed upon the forearm by three muscles, which pass downward from the inner condyle or expanded end of the humerus, and are termed the *radial flexor*, the *ulnar flexor*, and the *long palmar* muscles. The first two of these muscles are inserted into wrist-bones on the radial and ulnar sides respectively, while the third expands into a fan-like *fascia* or membrane in the palm of the hand, and thus serves both to support the skin of the palm and to protect the nerves and vessels which lie below it. Beneath the palmar fascia lie two sets of *flexor* muscles of the fingers, and they present so beautiful a mechanical arrangement as to merit special notice.

The *superficial* or *perforated flexor* muscle passes down the front of the forearm and divides into four tendons, which become apparent after the removal of the palmar fascia, and are inserted into the second phalanges of the fingers, each tendon splitting at its termination, to give passage to the similar tendons of the *deep* or *perforating flexor* muscle, which passes from the upper part of the ulna to be inserted into the last phalanx of each finger. These *flexor* muscles are antagonized by the *common extensor* muscle of the fingers, which, like the flexors, divides into four tendons, one for each finger. Besides these, there are a special *extensor* of the index-finger, a series of muscles forming the ball of the thumb, which move that organ in almost every direction, and various small slips giving lateral and other movements to the fingers.

The hand possesses marvelous adaptability to a great variety of uses. The fingers are fitted for grasping small objects, or for suspending the body from a horizontal bar. The hand may be made into a cup for conveying fluid to the mouth, or extended rigidly, as when swimming. A small needle may be used with great precision and delicacy in the same hand that wields a heavy sledge-hammer or holds a taut rein over the back of a turbulent horse. The great flexibility of the fingers and their capacity for training in accurate work is seen in their use in playing upon the violin or the piano. Some of the commonest daily uses of the hand consist of very intricate and complex working of groups of muscles in which coördination is exact. Controlling the pencil in drawing or writing, and rolling a cigarette may be cited as examples. It is not strange, in view of its adaptability and capacity for such accurate adjustment, that the hand was thought in old times to be a reservoir of special force which passed out of it upon occasion. The 'laying on of hands' for the cure of the sick, or for the transmission of a beneficent influence, is as old as the Scriptures; and the touch of royalty was supposed to possess special virtue in healing scrofula, or 'king's evil.'

The markings in the palm of the hand are supposed to be indications of the character and temperament, and disciples of palmistry (q.v.) believe they can read the secrets of the future in the records of palmar lines and folds. The papillæ on the skin of the finger-tips are arranged in concentric or ovoid lines. Probably these lines are never identical in different individuals. It is said that the Chinese use an impression of the papillary lines on the pulp of the thumb-tips as a means of identification; and it was seriously proposed in this country to add to the measurements of criminals by the Bertillon method impressions of their thumbs as an additional standard of comparison and identification. The investigations of Francis Galton (q.v.) in this respect were noteworthy. Fingers differ much in their size and model, and give hands different expressions. From the natural position of the hand at rest may be inferred much concerning the temperament, genius, and mentality of its owner. This fact is well stated in Warner's *Physical Expression* (New York, 1886), one of the most original works on this subject. Right-handedness is a natural condition, for which several causes have been assigned, no one of them being convincing. It has been considered due to a larger arterial supply to the right side; to "an innate tendency to a predominance of nutrition on the right side in fœtal life" (Breschet); to the position of the fœtus *in utero;* and to the assumed fact that the centre of gravity of the body lies on the right side. Left-handedness occurs in about 9 per cent. of human beings.

There are many congenital and developmental anomalies encountered in a study of hands. In some rare cases the hand is wanting altogether. This condition is termed 'acheiria.' If one or more fingers be missing, the condition is termed 'ectrodactylism.' 'Hypophalangism' is the name given to the condition in which the number of phalanges in a finger is less than normal. 'Polycheiria' denotes a supernumerary hand; 'polydactylism,' a supernumerary finger; 'polyphalangism,' the condition in which the number of phalanges in a finger is greater than normal. The union of fingers together, web fingers, or 'syndactylism,' also occurs; as well as cleft-hand, club-hand, and other deformities. In the disease acromegaly (q.v.) an enlargement of the hands takes place. Changes in the fingers and hands occur in many other diseases, as in myxœdema and syringomyelia (qq.v.). In pulmonary tuber-

culosis the extremities of the fingers are bulbous, or clubbed, from change in the condition of the peripheral circulation.

Consult Gray, *Anatomy, Descriptive and Surgical* (London, 1897).

HAND, Comparative Anatomy of the. In birds the hand has been so profoundly modified for flight that it is considered as a distinct sort of organ—the 'wing.' Among Amphibia we find the tailed forms have the hand constructed on the same general plan as the foot; it thus consists of digits, palm, and wrist; or, in terms of the skeleton, phalanges, metacarpals, and carpals, the latter the equivalent of the tarsals of the foot; in all amphibians there are four digits on the hand, except in three genera which have only two or three, but the number of phalanges differs considerably. The Urodela have a carpus of nine bones, a centrale, radiale, ulnare, intermedium, and five carpales; but in the Anura the intermedium is wanting. Among reptiles we find a general resemblance in the hand to that of the Urodela, though the digits bear claws or nails, which are always wanting in the Amphibia; crocodiles have no intermedium, and the carpales are only partially developed.

Among mammals we find a very great variety in the form and uses of the hand, the number of functional digits varying from one to five, though the number of phalanges is remarkably constant, for except in Cetacea there are two in the first and three in each of the others. In monotremes and marsupials the hand possesses no peculiar features worthy of special note, though in Echidna it is very stout and powerful, while among kangaroos it is rather small and comparatively feeble. The hands of the Edentata are remarkable for the reduction in the number of digits to four, three, or even two, and the long and very strong claws which they bear. In the Ungulata we find an even stronger tendency toward suppression of digits, for there are never more than four, and usually there are only two, sometimes only one, functional. In this order the hand resembles the foot (q.v.) so closely that it is not necessary to repeat here the various modifications; suffice it to say that the tapirs have four digits on the hand and only three on the foot, and that the metacarpals of the camel are separated by a deep cleft. In the Sirenia there are only four digits, and these are united by the integument to form paddles and bear only rudimentary nails. The Cetacea also have the hands transformed into paddles; but the carpus is made up of polygonal bones, the phalanges are numerous, and there are no nails. The hand of the Carnivora has never less than four digits, and they always bear claws, usually sharp and curved, and in cats retractile. The hand of the elephant is remarkable for being larger than the foot, and for its very short and thick carpal, metacarpal, and phalangeal bones. Hyrax has four toes on the hand, but only three on the foot, and the nails are nearly flat. The Rodentia have rather small, often weak hands, with five clawed digits, while the Insectivora have rather stout hands, especially the moles. Of all mammals, bats have the most profoundly modified hands, since with them, as with birds, flight is the object in view. There is only one bone in the proximal series of the carpus, and the metacarpal bones and phalanges are greatly elongated to form the framework for the wing, which consists of a delicate membrane stretched between the digits and the foot. There are five digits, but only the first two (sometimes only the first) are provided with claws. Among the Primates we find a hand more nearly like that of man, the digits being provided with flat nails, and the first digit being opposable to the others and thus forming a true thumb. The marmosets, however, have sharp curved claws, and the thumb is not opposable. Of all mammals, the gorilla has a hand most like that of man.

Consult: Wiedersheim, *Comparative Anatomy of Vertebrates* (New York, 1886); Huxley, *Anatomy of Vertebrated Animals* (New York, 1886).

HAND, Edward (1744-1802). An American soldier of the Revolution, born at Clyduff, Kings Co., Ireland. He came to America in 1774, and practiced medicine in Pennsylvania until the outbreak of the Revolution, when he served at the siege of Boston as lieutenant-colonel in William Thompson's brigade. In 1776 he was appointed colonel. He served in the battles of Long Island and Trenton in 1777; was promoted to brigadier-general; succeeded John Stark at Albany (1778); and took part in Sullivan's campaign against the Six Nations. He was in command of a brigade of light infantry (1780), and soon after succeeded Scammell as adjutant-general; in 1798 Washington recommended him to a like post for the war with France. He was elected to Congress (1784), and was a signer of the Pennsylvania Constitution (1790).

HANDBALL. A variety of 'Fives' practiced in the United States chiefly on account of its physical benefits in training for contests of endurance, though it is also one of the sports under the regulations of the Amateur Athletic Union. In its simplest form it consists of scoring the ball against a single back wall, with a lined-out space in front; but in its home, Ireland, the court or 'alley' on which it is played has also side walls extending the length of the court (60 feet). The floor is 60 × 28 feet, and about the centre of it, parallel with the end wall, a line is drawn called the 'short line.' Sixty feet from the end wall another line is drawn, called the 'over line,' and every service coming off the wall must fall between these two lines to be in play. The game is started by one player 'tossing' out the ball on to the ground and hitting it on the rebound, with his hand, against the end wall. If it falls inside the short line, and the other player fails to return it, it counts an 'ace' to the server. Should it be returned and the original server fail to return it, it is a 'hand out.' Then the service changes, and the game goes on alternately. The game is won by the player who first gets 15 or 20 aces, as agreed.

HAN'DEL, George Frederick, Ger. Georg Friedrich Händel, hen'del (1685-1759). A famous German musical composer, chiefly renowned for *The Messiah*, still the most popular of oratorios. He was born at Halle an der Saale, February 23, 1685. His father, a barber, and afterwards a surgeon, at Halle, so opposed the development of his son's musical proclivities that the lad was obliged to practice at night upon a small clavichord secretly placed in the attic, when the rest of the family were asleep. A visit paid with his father in 1692 to a stepbrother in the service of the Duke of Saxe-Weissenfels

had important results. Whenever, during this visit, young Handel found opportunity, he stole into the ducal chapel and played upon the organ. The Duke, chancing to hear him, questioned him, and learning of his father's opposition, persuaded the latter to abandon his intention of making a lawyer of the boy. As a result, on returning to Halle, Handel began a thorough study of music under Zachau. Going to Berlin in 1696 to pursue his studies further, he became acquainted with Ariosti and Buononcini.

In 1703 he took a modest position in the orchestra of the Hamburg Opera House, but soon astonished the public by the skill with which he presided at the harpsichord during the temporary absence of the renowned Keiser. At this time he also applied for the post of organist at Lübeck; but learning that one of the stipulations in the competition was that the successful candidate should marry the daughter of the retiring organist, he withdrew. At Hamburg he formed a friendship with Mattheson, and when, in 1705, Handel produced his first opera, *Almira*, Mattheson took the chief rôle.

Visiting Italy, Handel produced in Florence the opera *Roderigo*, and in Venice *Agrippina*, which he composed in three weeks, and which was received with enthusiasm. He met Scarlatti, who so greatly influenced Handel's subsequent works, Gasparini, and Lotti, and in Rome became the intimate of Cardinal Ottoboni. In 1709 he took service with the Elector George of Hanover (afterwards George I. of England).

In 1710 Handel went to England, where he spent practically the rest of his life. There the taste for Italian music was on the increase, and his *Rinaldo* achieved great success. The opera was patched together from his earlier works in fourteen days, and would have been finished sooner had the translator of the libretto been able to keep pace with him. The score contains the familiar "Lascia che io pianga," still a very popular concert number. The year 1713 saw the production of his "Te Deum" and "Jubilate," in celebration of the Peace of Utrecht. They brought him a life pension of £200. When George I. ascended the English throne, Handel, though previously in his service, avoided him. He feared his Utrecht music might have offended the former Elector, as the German Protestant princes had not regarded the treaty with favor. But his "Water Music," performed during the Thames fête, led to a second annuity of £200. For three years, beginning 1718, Handel was musical director to the Duke of Chandos, and during that time composed, among other pieces, the two Chandos "Te Deums" and the twelve Chandos anthems. From this time also dates "The Harmonious Blacksmith," which he is said to have written after having taken refuge in a smithy during a storm. During the period from 1720 to 1740, Handel, spurred on by the rivalry of Ariosti and Buononcini, produced over a score of excellent operas. The fact that their instrumentation was not fully written out, and the change in the style of opera demanded in England, has prevented these works from receiving their just appreciation; but it is beyond cavil that they were superior to the compositions of his contemporaries, and were scarcely inferior to his oratorios.

Handel's career in England should have been uninterruptedly prosperous, but he ruined himself financially by undertaking, in rivalry with Buononcini, whom he finally vanquished, the responsibilities of operatic management as well as of composition. He, however, retrieved his fortunes by his oratorios. In January, 1739, he produced *Saul*, followed in April by *Israel in Egypt*, but although both oratorios were highly praised they met with no popular favor at the time. The latter is considered by many even superior to his famous *Messiah*. *The Messiah* was produced in the autumn of 1741 in Dublin. At the first London performance, March 23, 1743, in Covent Garden, when the "Hallelujah Chorus" was reached, the King and the whole audience rose, and thus established a custom which continues to this day. George II.'s victory at Dettingen was celebrated by Handel with the "Dettingen Te Deum and Anthem." In 1752 his eyesight began to fail, and he became totally blind. He, however, continued to accompany his oratorios on the organ, and did so at a *Messiah* performance only eight days before his death, which occurred April 14, 1759. He is buried in Westminster Abbey.

Though of liberal disposition and much interested in charity, Handel was at times choleric. Quarrels with his singers had much to do with his failure as a manager.

Handel's service to music lies largely in the grace and freedom with which he handled the musical forms of his day, especially as compared with the severer Bach, of whom he was a contemporary. Though Bach is now acknowledged to be far the greater, the fact that their immediate successors took them both for models gave greater variety and plasticity to the development of music. Handel founded no school; he lacked the genius for creating new forms, or for revolutionizing existing musical conditions. His choral work, especially in *Israel in Egypt*, *The Messiah*, and *Solomon*, is great because of the massive effects he obtains by apparently simple means, though in reality many of the choruses are worked out with infinite detail. Greater musicians have superseded him in the fields of operatic and instrumental composition, but in oratorio he is still supreme. It has been shown that on occasion he helped himself to the music of other composers, but he was original enough to borrow without losing esteem. Beethoven greatly admired his music, and during his last illness found enjoyment in looking over a new edition of Handel's works. See ACCOMPANIMENT.

BIBLIOGRAPHY. Marshall, *Handel*, in the "Great Musicians Series" (New York, 1883), an excellent short life; Rockstro, *Life of G. F. Handel* (London, 1883), and Chrysander, *G. F. Handel* (Leipzig, 1858-67), the most authoritative biographies; Bray, *Handel: His Life, Personal and Professional* (London, 1857); *Great German Composers* (New York, 1878); Whittingham, *Life and Works of Handel* (London, 1882); Mainwaring, *Memoirs of the Life of Handel* (London, 1760).

HANDEL AND HAYDN (hi'd'n) **SOCIETY.** See CHORAL SOCIETIES.

HANDELMANN, hän'del-mân, GOTTFRIED HEINRICH (1827-91). A German historian and antiquary, born at Altona, and educated at Kiel, Heidelberg, Berlin, and Göttingen. His first historical work was *Die letzten Zeiten hanisscher Uebermacht im skandinavischen Norden* (1853).

With his friend Theodor Lehmann he edited *Jahrbucher fur die Landeskunde der Herzogtumer Schleswig-Holstein und Lauenburg* (1858-63). After several years devoted to American history, he turned his attention again to German antiquities, especially in his own province. In 1866 he was made professor at Kiel and conservator of the antiquities of Schleswig-Holstein. Handelmann's other historical works include: *Geschichte der Vereinigten Staaten* (2d ed. 1860); *Geschichte der Insel Haïti* (2d ed. 1860); *Geschichte von Brasilien* (1860); *Die dänische Reunionspolitik um die Zeit des Siebenjährigen Krieges* (1866, 1870).

HAN'DEL SOCIETY. (1) A society formed in England in 1843 for the purpose of publishing Handel's works. Its object was accomplished between 1843 and 1858. The society, however, was dissolved in 1848. (2) A German society formed at Leipzig in 1856, which under the editorship of Chrysander has issued Handel's works in 100 folio volumes (1856-94).

HANDFASTING (AS. *handfastnung*, a clasping of the hand, from *hand*, hand + *fastnung*, fastening, from *fæstnian*, to fasten, from *fæst*, OHG. *fasti*, Ger. *fest*, fast, firm). An ancient ceremonial of betrothal, which prevailed extensively in Western Europe during the early Middle Ages, and which consisted in the plighting of troth and the clasping of hands in the presence of witnesses. It belonged to the class of betrothals known as *sponsalia per verba de presenti*. In Scotland the practice of handfasting developed into an irregular form of marriage of a temporary character, good for a year and a day. At the end of that time the relation came to an end or was made permanent by a ceremonial marriage. See BETROTHAL; MARRIAGE.

HAND GRENADE. A shell designed for throwing with the hand. In various forms they were used for many hundred years; at first, as mere envelopes containing incendiary composition, and afterwards as explosive shells. The invention of the shell-gun caused them to fall into disuse, and upon the advent of the modern high-powered fast-firing gun, which stopped hand-to hand fighting, they disappeared entirely. See GRENADE.

HANDICAPPING (from *handicap*, apparently *hand i' cap*, in allusion to the drawing of lots from a cap). In all contests dependent upon strength and skill there will be some so superior that if they start under equal conditions with the other contestants they must always win. The consequence of this, if unrestricted, would be to deter other contestants; whereby not only would the sport be limited to these few, but the second class of players would lose the benefit of playing with them, and learning from them the highest class in form. To remedy both these evils recourse is had to handicapping, i.e. an extra burden is placed upon, or a special requirement made of, a superior competitor, in favor of an inferior, in order to make their chances of winning equal.

In all sports wherein the competitors are to meet as members of the same association, careful note is taken of the performances of every man, as they occur, i.e. the number of times he competes against other members of it, against whom it is and by what margins he wins.

In speed foot-races, in swimming, and in similar point to point contests, the slower performer in a handicap race has so much start ahead of the man whose past performances have put him in the first class, and therefore has a shorter distance to travel than his expert rival. In lawn tennis the players are handicapped by giving or owing strokes, or by giving *bisques*. In cricket handicapping is usually accomplished by allowing a large number of players to the inferior team. 11 men playing against 18 or 22. In horse racing on the flat, the horse which has proved itself in the past by its performances, or which by age or size or sex is naturally superior, is, where handicapping is resorted to, required to carry a heavier jockey, or to have weights placed on the saddle which, with the jockey's weight, will effect the same object. In polo, as practiced in America, the different players are handicapped by an allowance or penalty of so many goals, i.e. in matches the teams whose aggregate handicaps are less than those of their opponents are allowed the number of goals which is the difference between them and their opponents. In yachting, the boats and their sails are measured, and the boats whose hull and sails are the largest have to make an allowance which is deducted at the end of the race from the actual time which it has taken to sail over a given course. In chess and draughts certain 'men' are allowed to the inferior player, and in billiards the better of two players allows a certain number of 'points' so as to equalize the game. These are the principles of handicapping; their application is an inexhaustible subject.

HAND LEAD. A small lead, weighing from 5 to 15 pounds, used for sounding in shallow water. Since the general adoption of the Thomson sounding-machine leads weighing more than 15 pounds are seldom used. See LEAD, SOUNDING.

HAND ORGAN. See BARREL ORGAN.

HANDS, IMPOSITION OF. The ceremony employed in religious use, both ancient and modern, to symbolize the conferring of certain inward spiritual gifts. Aaron and his sons were directed to lay their hands upon the heads of the victims which were to be offered in sacrifice (Ex. xxix. 10, 15, 19). By a similar ceremony Moses set Joshua apart as the leader of the people (Num. xxvii. 23). Christ was entreated to heal the ruler's daughter (Matt. ix. 18) by the same action, and He Himself adopted it in blessing children (Matt. xix. 15). It is apparent from the New Testament that it was considered from the beginning of the Christian Church to convey spiritual grace, specifically the gift of the Holy Ghost (Acts viii. 17; I. Tim. iv. 14). It was accordingly employed in confirmation, ordination, and the reconciliation of penitents. The name *chirothesia* was used for the actual laying on of hands, while that of *chirotonia* designated the mere symbolic extension of the hand where the recipients of the grace were more than one. The imposition of hands is retained in the Roman Catholic and Anglican communions in confirmation and ordination, for the latter purpose among the Presbyterians also; while in the modern Roman Catholic Church the mere authoritative lifting of the priest's hand has taken the place of the former actual contact in absolution.

HANDSAW-FISH. A name in California, translating the Spanish *serra*, for the local lancet-

fishes, in reference to their rows of sharp teeth. See LANCET-FISH.

HANDSEL (AS. *handselen*, Icel. *handsal*, delivery into the hand, from *hand*, hand + AS. *selen*, *sylen*, Icel. *sal*, Eng. *sale*, a giving, from *sellan*, *syllan*, to give, OHG. *sellan*, Eng. *sell*). A transaction of sale or barter of chattels or the striking of a bargain, evidenced by the shaking of hands—an ancient ceremonial which can be traced in many systems of primitive law. Its modern form is the giving of earnest (q.v.). The term is also sometimes used to denote earnest-money, or part payment, by way of binding a bargain. In Scotland it popularly signifies a first transaction in trade, as, for example, the first sale effected in the day or week; and is likewise employed to signify a present in the nature of a New Year's gift on the first Monday in the year —hence called Handsel Monday.

HANDSOME SWORDSMAN, THE. See BEAU SABREUR.

HANDS'WORTH. A suburban municipality of Sheffield, in Yorkshire, England, three miles east-southeast of that town (Map: England, E 3). It is noted for its extensive manufacturing industries. Population, in 1891, 10,300; in 1901, 14,150.

HANDSWORTH. A manufacturing town of Staffordshire, England, a suburb of Birmingham (Map: England, E 4). It has undergone extensive improvements, and has a number of public works. Population, in 1891, 32,750; in 1901, 53,000.

HANDWRITING. The authentic signature or other writing of a person by his own hand. Modern law, which makes the validity of many legal acts depend upon their being committed to writing and subscribed by the party to be charged thereon, has conferred great importance upon the handwriting of the signature of legal instruments, and where such handwriting is in dispute, it must often be proved by the evidence of third persons. This is effected by calling a witness who either saw the individual write the identical words, or who by correspondence, or by having previously at other times seen the same person write other papers, can swear that the paper is the handwriting of the individual to whom it is attributed. It will be noticed, however, that unless the making of the writing in question was actually observed by the witness, his testimony will belong to the class of opinion evidence, the probative force of which is very different from that of direct evidence. Sometimes, where no direct evidence can be had, bank tellers and others accustomed to compare the niceties of handwriting are allowed to give their evidence, or rather state their belief as to the writing; but this kind of evidence is looked upon with great suspicion, and is much discountenanced. The great and growing importance of handwriting evidence in recent times has produced a class of professional experts, who have given a new value to evidence of this character by the profound and scientific character of their study of handwriting. But their evidence remains mere opinion and continues to share in the discredit which has usually attached to evidence of this character. See EXPERT EVIDENCE; FORGERY.

In cases where a jury are called upon to determine a disputed question of handwriting, they are now allowed to form their own opinion by comparing the disputed writing with other writings admitted to be by the same party. In England this could not be done before 1854, but it is now permitted in both civil and criminal cases. In Scotland, a jury may also be allowed to judge of the handwriting in this way in any case. In some countries—as, for example, in Scotland—a will, if written in the testator's handwriting, is admitted to be genuine without the attestation of witnesses, being then called a holograph (q.v.) instrument; but there is no such privilege in England or Ireland, as all wills, by whomsoever written, must be attested by witnesses. Consult: W. Anderson Smith, *Progress of Handwriting* (1887); Frazier, *Manual of the Study of Documents* (1894).

HANDY ANDY. A humorous Irish story by Samuel Lover (1842), notable for its Irish wit.

HÄNEL, hā'nel, ALBERT (1833—). A German jurist and politician, born in Leipzig. He studied at Vienna, Leipzig, and Heidelberg, in 1860 became a professor at Königsberg, and in 1863 at Kiel. One of the founders of the Liberal Party in Schleswig-Holstein after the annexation of the duchies to Prussia in 1866, he was elected to the Prussian Chamber of Deputies and the Reichstag of the North German Confederation, and subsequently to the Imperial Reichstag. He became known as a leader of the so-called 'Fortschrittspartei,' or Progressists, which, after the fusion with the Secessionists in 1884, was styled the 'Deutschfreisinnige Partei.' Upon the break-up of the party in 1893, he represented the 'Freisinnige Vereinigung' (Liberal Union), but in the elections of the same year to the Reichstag he was defeated by the Social-Democratic candidate. In 1898 he was reëlected. His writings include: *Studien zum deutschen Staatsrecht* (1873-88), and *Die Gesetzgebung des deutschen Reichs über Konsularwesen und Seeschiffahrt* (1875).

HANFSTÄNGL, hänf'stĕng'l, FRANZ (1804-77). A German lithographer and photographer, born in Bayernrain. He studied lithography under Mitterer at Munich, and spent six years in the Munich Academy (1819-25). He went to Dresden in the following year and began his great work, completed in 1852, of copying in lithograph the canvases of the Dresden Gallery. In 1844 he returned to Munich, leaving his establishment at Dresden to his brothers Max and Hans. From 1848 to 1853 he gave up lithography for galvanography, and then devoted himself almost entirely to photography and later to photogravure and heliogravure. His son EDGAR HANFSTÄNGL (1842—) succeeded to the business in 1868. The most important publications of the house are the periodical *Die Kunst unserer Zeit*, first published in 1890, and fine collections of carbon-print reproductions, including the contents of the principal European galleries, and the *Galerie moderner Meister*.

HANG-CHOW, häng'chou'. A foo or departmental city of China, and capital of the Province of Che-kiang, the smallest of the 18 provinces (Map: China, E 5). It is situated near the southern end of the Grand Canal, within two miles of the left bank of the Ts'ien- (or Ch'ien-) tang River. Its walls have a circuit of 12 miles, are 30 to 40 feet high, 20 to 30 feet thick, and are pierced with 10 large gates, controlled by the Tatar general, who has a force of 7000

Tatars under his command. The streets are tolerably wide and clean, and there are many good shops. The principal street which runs from north to south is four miles long. The western wall is washed by the famous Hsi-hu or West Lake, the chief attraction of the city. It is a beautiful sheet of water about eight miles in circumference, dotted with islands on which are built monasteries, memorial halls, and shrines. On its western side is an abrupt but magnificent range of hills. A little farther to the west are numerous finely situated Buddhist temples to which tens of thousands of pilgrims repair daily. Hang-chow has long been noted for its magnificence, its wealth, and its luxury. Marco Polo visited it several times toward the close of the thirteenth century, and describes it as 100 miles in circuit, and gives the number of its bridges as 12,000, all of them of stone. The name he gives it is *Kinsay*, a corruption of Chinese Kingsze, meaning 'capital' or 'metropolis,' Hang-chow having become in 1127 the capital of the Sung dynasty when the Kin Tatars conquered the northern provinces.

In December, 1896, Hang-chow was opened to foreign residence and trade in accordance with a treaty made at Shimonoseki between the Chinese and Japanese in the spring of the preceding year. A foreign settlement containing 1809 *mou* or Chinese acres, or about 300 English acres, has been laid off on the east bank of the Grand Canal about 10 *li* (3⅓ English miles) from the Wun-li Gate. It is described as low and marshy, and infested with mosquitoes. Communication with the city can be maintained by small canals leading from the Grand Canal. Hang-chow is noted for its silk. Here is the Imperial silk-factory in which are woven the beautiful silk fabrics for the use of the Imperial household, and there are about 7000 private looms giving employment to about 30,000 persons. There is also a cotton-spinning mill with 15,000 spindles. Hang-chow is noted for its fans, and fan-making is an important industry. It has no direct foreign trade, all produce of native origin finding its way to Shanghai by the canal or coastwise, and foreign goods come in in the same way. The exports consist chiefly of silk, paper fans, lotus-nuts, and tea; and the imports of copper and spelter from Japan for use in the mint, and of native produce, of brass buttons, leather, and tobacco. In 1899 the gross trade of the city passing through the custom-house amounted to 12,000,000 taels. The Ts'ien-tang River and the Grand Canal are the chief arteries of inland trade. The former is navigable at all seasons, but unfortunately is tortuous and shallow, and at certain seasons of the year is subject to an 'eagre' or 'bore' which rises to a height of 15 feet, and has a velocity of 15 miles an hour. Further it is not connected with the Grand Canal, some miles distant, and the transfer of goods and passengers is very slow, troublesome, and expensive. There are 400 houses engaged in the steam-launch transportation business on the canal, and the journey to Shanghai may be made in from 20 to 24 hours. The seaport of Hang-chow is Chapu, 20 miles lower down the river. The population of the city proper is estimated at 500,000, but the suburbs, which are properly included in the name Hang-chow, are densely populated, and the whole may be set down as 800,000. On December 29, 1861, Hang-chow was captured by the Tai-ping rebels after a protracted siege in which it suffered much.

BIBLIOGRAPHY. *Marco Polo*, edited by Yule (2 vols., London, 1874); *Notes on Hangchow*, by G. E. Moule (1889); and Scidmore, *China, the Long-lived Empire* (New York, 1900).

HANG'ER, GEORGE (c.1751-1824). An English soldier and military writer, fourth Baron Coleraine. After completing his education at Eton and Göttingen, he entered the army as a guardsman, but was afterwards captain in the Hessian force sent to America during the Revolutionary War. By 1782 he was major of a British dragoon regiment which was disbanded at the peace, and as Hanger found he could not live upon half pay, he spent nearly a year in a debtors' prison until his retiring allowance was doubled. He set himself up as a prophet, foretold the Civil War in America, and was a well-known man about town in London, intimate with the Prince Regent, and noted for his eccentric vulgarity even more than for his published works: *An Address to the Army in Reply to Strictures by Roderick McKenzie on Tarleton's History of the Campaigns of 1780 and 1781* (1789); *Anticipation of the Freedom of Brabant* (1792); *Military Reflections on the Attack and Defense of the City of London* (1795); and *The Life, Adventures, and Opinions of Colonel George Hanger* (2 vols., 1801).

HANG FIRE. When the powder-charge of a gun fails to explode promptly upon being ignited it is said to *hang fire*. It is due to a variety of causes, such as moisture, insufficient priming charge, etc., and is a prolific cause of accidents with modern breech-loading guns. Smokeless gunpowder is not easy to ignite, and the small priming charge of black powder sometimes fails to give out a sufficient burst of flame, in which case only a small portion of the charge takes fire, and the burning may last several seconds before the charge explodes. When several guns are being fired the man who operates the breech may think his own has gone off and open the breech while the powder is still burning. If the gun is of large size premature opening of the breech may cause the death or serious injury of every one in the vicinity. See GUNS, NAVAL.

HANGING. The common-law mode of inflicting capital punishment. The sentence pronounced by the court indicates the method of execution, viz. that the convict "be hanged by the neck until he is dead." The time and place of the execution are also, within statutory limits, fixed by the sentence. In England, formerly, in atrocious cases, it was usual for the court to direct a murderer to be hung upon a gibbet in chains near the place where the crime was committed—also at a later period to order the body to be dissected—and the execution to take place on the next day but one after the sentence was passed. But these useless severities were abolished by the statute 6 and 7 Will. IV., c. 30.

The mode of punishment by hanging was first adopted in England in 1241, when Maurice, a nobleman's son, was hanged for piracy. Other more barbarous modes of inflicting death were long in use, but have been abolished, and hanging has long been the ordinary, because the most humane, mode of executing capital punishment, in the United States as well as Great Britain.

In a few of the United States electrocution (q.v.) has been substituted for hanging as a less repulsive and more humane method of capital punishment. The publicity which formerly attended the hanging of criminals has, in most civilized communities, been done away with. In treason, hanging is part of the statutory punishment, coupled with mangling the body, though the Crown may change the sentence into simple beheading, except in the case of women, who are, in deference to their sex, legally exempt from the latter form of execution.

The cause of death in hanging is complex. The compression of the windpipe by the cord, the obstruction of the return of venous blood from the head, and of the flow of arterial blood to the brain, the stretching or tearing of the nervous structures of the neck, and, in some instances, dislocation or fracture of the vertebræ, may concur in the production of the fatal effect, which, though attended with violent struggles in some cases, is probably as nearly instantaneous as possible. See STRANGULATION; EXECUTION; CAPITAL PUNISHMENT.

HANGING, DRAWING, AND QUARTERING was, in English criminal jurisprudence, a mode of executing the sentence of capital punishment on a traitor. It consisted in drawing the criminal to the place of execution on a hurdle, and, after hanging him, dividing the body into quarters. This form of executing the sentence was substituted by statute (54 Geo. III., c. 146) for the more ancient and barbarous practice (to which the word 'drawing' originally referred) of disemboweling the criminal. The more humane and decent method of execution by hanging, without the spectacular concomitants of drawing and quartering, is now employed in Great Britain as well as in the United States.

HANGING GARDENS OF BABYLON. The name commonly given to a structure of ancient Babylon, famed as one of the seven wonders of the world. It appears to have been a sort of tower or pyramid, rising in terraces, planted with trees, flowers, and shrubs, and is said to have been constructed by Nebuchadnezzar for the gratification of his Median Queen, because the Babylonian plain seemed dreary to her in comparison with the mountain scenery of her native land. Strabo says the structure was a square, four plethra in area; it rested on arches supported by hollow pillars of burnt brick, filled with earth, in which the roots of the trees were planted; the top consisted of terraces, and a force of men was constantly employed pumping up water from the Euphrates for irrigation. The account that ascribes the gardens to the mythical Semiramis has no historical value. It is thought that the northern portion of the mound Amran ibn Ali which forms part of the ruins of Babylon occupies the site of the gardens.

HANGING ROCK, BATTLE OF. A battle fought on the western bank of Hanging Rock Creek, S. C., on August 6, 1780, during the Revolutionary War, between about 800 American militia under Colonel Sumter, and an equal number of Loyalists under Major Carden. The Americans in an impetuous charge at first drove the Loyalists back from their camp, but delaying to plunder, fell into disorder, and, in consequence, were themselves driven back and forced to retreat. The Loyalists lost 269 in killed, wounded, and missing. The loss of the Americans was not recorded. Consult: Dawson, *Battles of the United States* (2 vols., New York, 1858); and Lossing, *Field Book of the American Revolution* (2d ed., New York, 1855).

HANGINGS. Pieces of textile fabrics, used to cover the walls of rooms, especially of churches, during the early Christian and Romanesque epochs. They were often of high artistic value. See TAPESTRY.

HANGING WALL. A term used to designate the upper or covering wall of an inclined ore body, mineral vein, or stratum. If the mineral deposit be flat the term *roof* is used. In mining it is usually necessary to support the hanging wall either by pillars of ore or masonry, or by props of wood. See FOOT-WALL.

HANGNEST. A name often used in books, for the birds of the American family Icteridæ, sometimes called 'troupials,' but more usually orioles, all of which build pensile nests. (See NIDIFICATION; ORIOLE.) The Baltimore oriole is the most familiar North American representative of the family, and is commonly known as 'hangbird' in certain localities.

HANGUL, hŭn'gōōl (native name). The Kashmir stag (*Cervus Kashmirianus*), which closely resembles the red deer (see DEER) of Europe, of which it may probably be only a local race. The antlers differ from those of the European stag in not forming a cup at the crown, which is simply forked. It is a forest-haunting animal, and in summer remains at elevations between 9000 and 12,000 feet, but in winter is driven down into the valleys by snow. The proper shooting season is in October and November, when the stags are full-antlered and seeking the does. They roam widely.

HANIFAH, hä-nē'fä, or **ABU-HANIFAH** (702-72). One of the four great Mohammedan Imams or Church fathers. He was born at Kufa on the Euphrates, and became founder of the Hanifites, the oldest of the sects of Mohammedans considered orthodox. His teachings were subsequently formulated into a code of Mohammedan law, which is still in force in many parts of the Ottoman Empire. He died in prison at Bagdad, where he had been placed for contumacy in refusing the office of Kadi, offered him by the Caliph, and declined because he thought himself unworthy of it.

HANKEL, hăn'kel, HERMANN (1839-73). A German mathematician, son of Wilhelm Gottlieb Hankel, born at Halle. He studied at Leipzig and at Göttingen under Riemann and Möbius, became privat-docent in mathematics at Leipzig in 1863, and professor extraordinary in 1867, and in the same year was called to Erlangen in the same capacity. His chief works were: *Zur allgemeinen Theorie der Bewegung der Flussigkeiten* (1861); *Vorlesungen über die komplexen Zahlen und ihre Funktionen* (1867); *Die Entwickelung der Mathematik in den letzten Jahrhunderten* (1869; 2d ed. 1884); *Zur Geschichte der Mathematik im Altertum und Mittelalter* (published posthumously, 1874); *Die Elemente der projektivischen Geometrie in synthetischer Behandlung* (also posthumous, 1875). For his biography and an estimate of his works, consult Zahn, "Einige Worte zum Anden-

ken an Hermann Hankel," in the *Mathematische Annalen* (Leipzig, 1874).

HANKEL, Wilhelm Gottlieb (1814-99). A German physicist. He was born at Ermsleben, and studied physics and chemistry at the University of Halle, where he later was appointed professor. In 1849 he became professor of physics at Leipzig, and served there until 1887, when he was forced to give up active duties. He devoted himself to the study of thermo-electric properties of crystals, and made many interesting discoveries in this field. Hankel's researches are published for the most part in Poggendorff's *Annalen* (Leipzig), and the *Berichte* and *Abhandlungen* of the Saxon Academy of Sciences. He also prepared a German edition of Arago's works, which was published at Leipzig (1854-60).

HAN-KIANG, hän'kyäng'. The name of several rivers of China, the most important of which is that which flows into the Yang-tse at Hankow (q.v.). It rises in the mountains in Shen-si, known as Ta-pa-ling (sometimes also called Kiu Tiao Shan, the 'mountain of nine ridges'), and flows east and south through the provinces of Shen-si and Hu-peh for a distance of about 1300 miles, for 1260 of which it is navigable in some degree. Its upper courses are through a mountainous region, and rapids are both numerous and dangerous. In certain seasons floods are common, the water rising in the narrower parts with great suddenness, sometimes to a height of 24 feet in as many hours. On such occasions the rapids are wiped out, and the river becomes a raging torrent. From Sin-pu-wan, the limit of navigation, to Tsze-yang Hien (400 miles), only small boats can be used. At the latter place goods and passengers are transshipped to larger craft, subject to a second transshipment at Lao-ho-k'ow (400 miles) or Fan-cheng (450 miles) to the ordinary river junk of the Han. At Lao-ho-k'ow the country opens out, and for the remaining 460 miles to Hankow navigation is easy, though shallows and shifting banks abound. The traffic on the river is considerable, and with a little dredging it is capable of being used by steamers of light draught as far as Fan-cheng or Lao-ho-k'ow, the two most important trading centres on the river. Other cities besides those already mentioned are Hing-an-fu, a large walled city on the right bank, with a great military depot in the vicinity, and Siang-yang-fu (also on the right bank), a quiet walled city opposite Fan-cheng, both of which are noted for the long and stubborn resistance (1268-73) which they offered to the Mongol armies of Kublai Khan. (Consult Yule, *Marco Polo*, vol. ii., London, 1871.) Prior to 1470 the river branched off from its present course about three miles above its present mouth and flowed through the plain behind what is now the foreign settlement of Hankow, and entered the Yang-tse some miles lower down. In that year it suddenly changed its course and poured its waters into the Yang-tse through its present channel.

HANKOW, hän'kou' (Chin., Han-mouth). An important river-port and commercial centre of China, situated in the very heart of the country, 600 miles from the sea, on the left bank of the Yang-tse, at the point where it is joined by the river Han in latitude 30° 32' N., longitude 114° 19' E. (Map: China, D 5). It occupies the angle formed by the junction of these two rivers, stretching along the east or left bank of the Han for over two and one-half miles, and eastward along the left or north bank of the Yang-tse for one mile. Its streets are narrow, crooked, and dirty, and usually much crowded with the screeching, heavily laden wheelbarrows used in the conveyance of the enormous quantities of goods which here find their point of transshipment. Adjoining the native town on the east is the foreign settlement, originally a British concession, but thrown open to all foreigners by the British Government shortly after the opening of the port in 1861. It extends along the Yang-tse for a distance of about 800 yards, a wide 'bund' or esplanade running along its entire length. It has fine streets, kept in splendid condition by a municipal council elected by the land-renters. Ground-rent is paid to the Chinese authorities through the British consul. The houses and business buildings are substantial, and are in marked contrast with those of the native town.

To the east of this lie the 'concessions' more recently acquired by the French, Russians, and Germans, and the foreign water-front has now a length of nearly three miles. Another new 'concession' has recently been opened by the Chinese authorities on the south or Wu-chang side of the Yang-tse, where foreigners may build business places and residences on certain conditions.

West of the native town, and across the Han, is the departmental city of Han-yang, to which Hankow (which is not a city) is subordinate, and directly across the Yang-tse from Han-yang stands the large and imposing city of Wu-chang-fu, capital of the Province of Hu-peh, and the seat of the Governor-General (or viceroy) of the two provinces of Hu-nan and Hu-peh, unitedly known as Hu-kwang, or Liang Hu—that is, 'the two Hu.' These three centres of population are included in the port and customs district of Hankow, and situated as they are in the centre of an unsurpassed network of rivers and lakes, they form the most important commercial centre of the country. Their total population is estimated at 1,500,000, of which Hankow has 800,000, or more than half.

Hankow is the first of the 'Five Chin' or great commercial emporia of the country. Its trade is chiefly distributive, but it has some industries, including a cotton-mill, a hemp-factory, a mint, and an ore-crushing establishment in Wu-chang, an arsenal and great iron and steel works in Han-yang, and a few miles lower down the river are great tanks for storing oil (capacity 5000 tons) which is tinned on the premises. The mouth of the Han swarms with native shipping, and the scene presented everywhere is one of great commercial activity. Regular steam communication is maintained with Shanghai and the other river and lake ports both above and below Hankow. I-chang, about 500 miles above Hankow, being at present the limit of steam navigation westward. The largest ocean steamers come to Hankow and load at great hulks moored off the river-bank. The Yang-tse, opposite the foreign settlement, is 1400 yards wide from brink to brink. In winter its average low-water depth is 40 feet in mid-channel, but in summer, when the rivers are in flood, the swollen waters frequently rise 50 feet to the brink of the bund, sometimes overflowing it, inundating the town. In flood time the scene off the native town is most exciting; many junks and boats come to

grief, and many lives are lost, notwithstanding the efforts of the stanch, splendidly managed 'Red Boats' of the native Life-Saving Society, whose stations are found throughout the whole course of the Yang-tse.

In 1900 the gross value of the trade of the port, according to the report of the Imperial Maritime Customs, amounted to $56,513,103, against $65,432,903 in 1899, the decrease of nearly $9,000,000 being due to the Boxer movement in the north and the consequent general unrest in the Yang-tse Valley. Of this, foreign imports amounted to $19,595,371, as follows: From Chinese ports, $19,017,810; the Continent of Europe (excluding Russia), $338,702; Japan, $144,975; Hong Kong, $75,488; the United States, $18,409. The chief imports of foreign origin were: Opium, 43,855 pounds; cotton piece-goods, 1,684,237 pieces; cotton yarn, 30,945,595 pounds; woolen goods, 48,886 pieces; metals, 3,563,242 pounds (including 18,201 piculs of lead for lining tea-chests). Among the 'sundries,' kerosene oil figures as 12,854,380 gallons. The chief exports are tea, rice, silk, tobacco, beans, coal, hemp, hides, vegetable wax, medicines, and wood-oil. Tea is always one of the largest items. In 1900, 36,306,654 pounds, value $4,356,624, were exported direct to foreign countries, and 26,441,654 pounds, value $3,176,534, to Chinese ports, whence no doubt much of it was re-exported to foreign countries. These figures include the large quantity sent overland via Kiakhta to Russia, as well as that sent by direct steamer to Odessa—usually the finest black tea which can be produced. One of the items of export to Europe was 4665 tons of crushed antimony ore (obtained from the Province of Kwei-chow), crushed, dried, and packed in bags in Wu-chang.

The shipping engaged in this great commerce is given in the Customs Report for 1900 as follows:

STEAMERS ENTERED INWARD

British	510	carrying	567,747	tons
Chinese	375	"	231,419	"
Japanese	142	"	111,364	"
German	107	"	115,800	"
Russian	8	"	16,024	"
Swedish and Norwegian	6	"	4,459	"

The number of steamers clearing outward was 1162, and the cargo carried, 1,049,704 tons, the different nationalities being represented in about the same proportion.

Hankow is one of the principal stations of the great trunk railway which is to connect Peking in the north with Canton in the south. The Hankow-Peking section (called the Lu-Han Railway) is already well advanced toward Hsin yang, 346 miles north of Hankow. The Hankow station is a few miles below the foreign settlement, but a branch with the necessary stations runs to the Han behind the foreign settlements. Hankow and the neighboring cities were all but destroyed during the Tai-ping Rebellion. (See HAN-YANG and WU-CHANG.) Consult Scidmore, *China, the Long-lived Empire* (New York, 1900).

HAN'LEY. A manufacturing town and municipal borough in Staffordshire, England, on the North Staffordshire Railway, and on a branch of the Trent and Mersey Canal, two and one-half miles from Newcastle-under-Lyme (Map: England, D 3). It is known as 'The Metropolis of the Potteries,' and is famous for its manufactures of earthenware and fine porcelain. It has coal and iron mines, iron furnaces and foundries, and brick-works. The principal portion of the town is on an elevated site; the streets, wide and regular, are brick-paved, and there are many handsome residences. The chief buildings are the town hall, mechanics' institute, museum, infirmary, national and board schools. There is a fine park. The town owns an electric-light plant, and maintains markets, baths, a cemetery, a free technical museum, and free libraries. It utilizes its sewage for the manufacture of fertilizers. Hanley's rise dates from the inception of the pottery industry. It has absorbed the former township of Shelton, and it received a municipal constitution in 1857. Population, in 1891, 55,000; in 1901, 61,500.

HANLIN YUAN, hän-lēn' yōō-wän' (Chin., College of the Forest of Pencils). The National Academy of China, membership in which is the highest literary honor China has to bestow on her scholars. It was founded by the Emperor Hsüan Tsung in 725, first as a coterie of scholars and poets whose society he courted, then as a learned body of copyists engaged in multiplying books. Lo-yang, in Ho-nan, then the capital, was its home; since then it has shared the fortunes of successive dynasties, and has been in Peking since 1403. During the 'Boxer' trouble of 1900 it was purposely burned down. Its members are the historiographers of the country, the compilers of its great encyclopædias, editors and commentators of its classics, etc., and have charge of literary matters in general, or are drafted off to the provinces as superintendents of education, literary chancellors, etc. Its membership is made up of honor men at the triennial examinations at Peking. See Martin, *Hanlin Papers* (New York, 1880).

HAN'MER, Sir THOMAS (1677-1746). An English statesman and scholar. He was educated at Westminster and at Christ Church, Oxford; was elected to Parliament for Suffolk (1701), and in 1713 became Speaker of the House of Commons. He retired from politics in 1727 and devoted himself to literature. He published (1744) an edition of Shakespeare, with illustrations by Gravelot, a work of no critical value, but of splendid typography. Pope, in the *Dunciad*, alludes to him under the name *Montalto* (book iv., 105).

HANN, hän, JULIUS (1839—). A German physical geographer and meteorologist, born near Linz (Upper Austria). He was educated at the University of Vienna, became a lecturer there on meteorology in 1868, and in 1873 professor of physical geography. Having held a professorship at Gratz from 1897 to 1900, he returned to Vienna in the latter year to occupy the chair of cosmic physics. In 1866 he established with Jelinek the *Zeitschrift der Oesterreichischen Gesellschaft für Meteorologie*, and in 1877 was appointed director of the Central-Anstalt für Meteorologie und Erdmagnetismus of Vienna, and elected to the Academy of Sciences. His researches dealing with such questions as the theory of storms, the decrease of temperature attendant upon increased elevation, and the violent south wind known to the Swiss as the Föhn, are extensive. His publications include: *Astronomische Geographie und Physik der Erde* for the *Allgemeine Erdkunde* (4th ed. 1886) of Hochstetter

and Pokorny; *Handbuch der Klimatologie* (1883); and *Die Temperaturverhältnisse der österreichischen Alpenländer* (1887).

HANNA. The usual name in British Guiana for the hoactzin (q.v.).

HAN'NA, Marcus Alonzo (1837-1904). An American manufacturer and politician, born at Lisbon, Columbiana County, Ohio, of Scotch-Irish parentage. In 1852 his father removed with his family to Cleveland, Ohio, where he established himself in a wholesale grocery business that soon became one of the most extensive in northern Ohio. Young Hanna was educated in the Cleveland public schools, and began a course at Western Reserve University, which was interrupted in 1857 by the failing health of his father. His father died in 1862, and he conducted the business with success until 1867, when he formed a partnership with his father-in-law, Daniel P. Rhodes. The firm of Rhodes & Co. dealt in coal, iron ore, and pig iron, and, under the management of the junior partner, its scope was extended, so that in a few years its property included coal and iron mines, and a line of lake steamships constructed in its own shipyards. In 1877 the firm name was changed to M. A. Hanna & Co., and Hanna became the controlling partner; but his activities required new fields, and he became interested in theatrical enterprises, the Cleveland Street Railway, banking, and railroading. At length he turned his attention to politics, gradually extending his influence from his home ward to city, State, and finally to national politics. In 1880 he was an active Republican worker in Cleveland; in 1884 he was a delegate to the Republican National Convention, and in 1888 he was again a delegate to that body, and this time made himself known as one of the managers of John Sherman's canvass for the nomination. In 1896 he suddenly acquired national prominence by the part he took in securing the nomination of William McKinley for the Presidency at the Republican National Convention at Saint Louis. Immediately after the convention he became chairman of the Republican National Committee, and conducting the campaign on the same principles that had won him success in business, secured the election of McKinley by the largest popular plurality given up to that time at a Presidential election. In March, 1897, Governor Bushnell appointed him United States Senator from Ohio to succeed John Sherman, who had resigned to become Secretary of State in President McKinley's Cabinet, and in the following year he was chosen by the Legislature Senator for the full term of six years. In the Senate he did not take a prominent part either as a debater or a legislator; but up to the death of President McKinley he was recognized as one of the most influential advisers of the Administration. He actively interested himself in the problem of the relation between capital and labor, and upon the organization of the National Civic Federation was made its president. In December, 1901, he became a member of a permanent board appointed to settle labor disputes.

HANNA, William (1808-82). An English clergyman, author, and editor, born at Belfast. He studied at the universities of Glasgow and Edinburgh, was ordained a minister of the Church of Scotland, was installed as pastor at East Kilbride (Lanarkshire) in 1835, and in 1837 became pastor at Skirling (Peeblesshire). Upon the establishment of the Free Church of Scotland in 1843 he, with his entire congregation, withdrew from the State Church and formed, at Skirling, a Free Church society. From 1850 to 1866 he was the colleague of Thomas Guthrie (q.v.) at Saint John's Free Church, Edinburgh. His pulpit discourses were marked by a quiet yet forceful manner of utterance, clear thought, and much literary excellence. He was appointed editor of the *North British Review* in 1847, but soon resigned, and wrote numerous works, of which the *Last Day of Our Lord's Passion* (1863) had a wide circulation. He is, however, best known for his edition of *The Posthumous Works of Thomas Chalmers* (9 vols., 1847), and his *Memoirs of the Life and Writings of Thomas Chalmers* (4 vols., 1849-52), which two publications won for him from Glasgow the degree of LL.D.

HANNAHILL. A local name for the black sea-bass (*Centropristes striatus*). See Sea-Bass.

HAN'NAY, David (1853—). An English journalist and author, born in London. Besides work on the *Pall Mall Gazette*, the *Saturday Review*, and *Saint James's Gazette*, Hannay wrote several books, mostly connected in some way with the navy: *Short History of the Royal Navy* (1898); *Admiral Blake* (1888); *Rodney* (1891); *Life of Marryat* (1889); *Life of Smollett* (1887). To the "Public Men of To-Day Series" he contributed *Don Emilio Castelar* (1896), and to the *Periods of European Literature*, "The Later Renaissance" (1898), his most elaborate work in literary history.

HANNAY, James (1842—). A Canadian journalist and historian, born at Richibucto, N. B., where his father was settled as Presbyterian minister. Called to the bar in 1867, he was appointed official reporter of the Supreme Court of the province (1867-73), and published two volumes of reports. Resigning his post, he became assistant editor of the Saint John *Daily Telegraph* (1873-83) and of the Montreal *Herald* (1883-84), and after serving on the staff of the Brooklyn *Eagle* (1885-87) he returned to Saint John to take the editorship of the *Gazette* (1888). In 1893 he became chief editor of the Saint John *Telegraph*. As a journalist, Hannay became well known throughout Canada for able editorials, brilliant sketches, stories, and ballads. Among his historical works are: *History of Acadia* (1879); *The Story of the Queen's Rangers in the American Revolution* (1883); *The History of the Loyalists* (1893); and *Life and Times of Sir Leonard Tilley* (1897).

HANNEMAN, hän'ne-män, Adriaen (1601-71). A Flemish painter, born at The Hague. He was a pupil of Ravesteyn in his native city, and went to England early in the reign of Charles I. He worked in London under Mytens, in the style of Van Dyck, and produced a number of portraits notable for fine color. On his return to The Hague he became Court painter to Mary of Orange. His works include portraits of Charles I., in the Vienna Museum; Jan de Witt (1652, Rotterdam Museum); and William Frederick of Orange (1661, Weimar Museum).

HAN'NIBAL. A city in Marion County, Mo., 112 miles northwest of Saint Louis, on the Mississippi River, and on several railroads, including the Chicago, Burlington and Quincy, the Wabash, and the Missouri, Kansas and Texas (Map:

Missouri, E 2). It has steamboat communication with various cities on the river; a large trade in lumber, tobacco, flour, and agricultural produce, and manufactures of lumber, stoves, shoes, car-wheels, cigars, cement, and lime. Among the features of the city are the public library building, the United States Government building, the municipal buildings, the city park, and a long iron and steel railroad and wagon bridge across the river. Settled in 1819, Hannibal was incorporated as a town in 1839. The government is conducted under a charter of 1845, revised in 1873. The mayor, annually elected, controls appointments to the administrative departments, those to the library board and finance committee alone being ratified by the council, which is unicameral, and of which the executive is a member. The school board is chosen by the people. The city owns and operates its electric-light plant. Population, in 1890, 12,857; in 1900, 12,780.

HANNIBAL (Phœnician, grace of Baal, Gk. *Ἀννίβας, Annibas*). A common name among the Carthaginians, the list of those famed in history extending to fourteen or fifteen. The greatest of all was the Hannibal of the Second Punic War, the son of Hamilcar Barca. He was born in B.C. 247. When he was nine years old he accompanied his father on his Spanish expedition, and before starting swore an oath of eternal hatred to the Roman name, which he kept through his whole life. After the death of Hamilcar he was employed by Hasdrubal, his brother-in-law, in most of the military operations which he undertook. When Hasdrubal was assassinated, the army with one voice elected Hannibal commander-in-chief—an appointment which the authorities at Carthage at once ratified. Hannibal, at this time in his twenty-sixth year, undertook the command, for he longed to strike a death-blow at his country's rival by attacking her on her own soil. Before he entered on a task of such magnitude he deemed it prudent to complete the subjugation of Spain, and accordingly spent two years in contests with some tribes hitherto independent of Carthage. Saguntum, a city in alliance with Rome, was attacked by him on the ground that its inhabitants were making aggressions on the Torboletes, subjects of Carthage. After a siege of eight months the city was taken, and the Romans, after an embassy had unsuccessfully demanded the surrender of the general who had thus violated the treaty, declared war in B.C. 218. Having taken measures for the defense of Africa and Spain during his absence, he started from New Carthage in B.C. 218, with 90,000 foot and 12,000 horse. This force was much thinned by his contests with the tribes between the Iberus and the Pyrenees, by the necessity of leaving Hanno with 11,000 men to keep them in subjection, by desertion in the passage of the Pyrenees, and by his sending home a portion of his Spanish troops. His object in this last act was to inspire the soldiers with thorough confidence in themselves and their general. From the Pyrenees he marched to the Rhône without opposition, since Scipio was at Massilia, four days' march from the point where Hannibal crossed the river in the face of the Celtic hordes who sided with the Romans. His next great difficulty was the passage of the Alps, which he effected in fifteen days, in spite of the attacks of the mountain tribes, the snows, storms, and other difficulties. Much discussion has taken place as to whether Hannibal crossed the Cottian Alps by the pass of Mont Genèvre (or Cenis), or the Graian Alps by the pass of Little Saint Bernard. For the former route, Michelet, Thierry, and most French writers argue; and for the latter, with better reasons, Niebuhr, Arnold, Mommsen, and others.

After allowing his army (now about 26,000 strong) some time to recruit in the rich villages of the friendly Insubrians, he first subdued the Taurini, a tribe hostile to the Insubrians, and took their chief city after a siege of three days, and thus forced into alliance with him all the Ligurian and Celtic tribes on the upper course of the Po. Scipio, having returned from Massilia, took the command of the army in the north of Italy, and met Hannibal on the plain near the river Ticinus. The Romans were entirely routed, and Scipio, who was severely wounded, retreated across the Po. The armies again met at the Trebia, with a like result, though the Romans, who had received reënforcements, were much more numerous. These battles were fought in B.C. 218. Having wintered in the neighborhood of the Po, and levied additional troops among the Gauls, most of whom were now his friends, Hannibal started southward as soon as spring permitted, marching through Liguria and the swamps of the Arno. In this difficult route immense numbers of his beasts of burden and horses perished, and he himself lost the sight of one eye. He next inflicted a severe defeat, near Lake Trasumenus, on the consul Flaminius. After this victory he crossed the Apennines to Picenum and Apulia, and thence recrossed to the fertile Campania, which he ravaged. Thither Fabius was sent with an army to oppose him, but no general engagement took place, the consul endeavoring to lead Hannibal into snares, which he succeeded in doing; but the Carthaginian extricated his army by a stratagem, and returned to Apulia. He wintered at Cannæ, and in June, or, according to others, in August (2d) of B.C. 216, almost annihilated a Roman army of 90,000 men under Terentius Varro and Æmilius Paulus, in the battle which was fought a little below the town. About 50,000 are said to have fallen, including Æmilius Paulus, and a host of Roman knights, senators, and other distinguished persons. Here Hannibal committed, perhaps, the greatest military error of his life, in not marching direct to Rome; but it is supposed that he refrained in order to allow the tribes of Italy to declare in his favor. Many in the south of Italy did attach themselves to his interests, but not in such numbers as he had anticipated. After some delay he marched on Neapolis, which he did not succeed in taking, but the gates of Capua were opened to him, and here he wintered. The enervating effect which the luxury of Capua is said to have had on his army has been greatly overdrawn; but his residence there forms, in one point of view, the turning-point in the war, which from this time became more of a desultory kind. Hannibal's great purpose was to arm the Italian nations against Rome, and so to crush her power by means of her own subjects; the Romans, on the contrary, henceforth avoided coming to a pitched battle with the Carthaginians, but sought rather to keep the tribes in awe and harass Han-

nibal and his lieutenants by small armies in different parts of the country. Hannibal traversed Italy in all directions, surprised the Roman generals, defeated their armies, captured their towns, such as Casilinum, Arpi, Tarentum, Metapontum, Thurii, Locri, and many others; he defeated Sentenius near Capua; Cn. Fulvius at Herdonea; Fulvius Flaccus on the Anio; Crispinus and Marcellus in Lucania; and the besieging army before Locri. In all these cases the armies were almost annihilated. The defeat of Hasdrubal, his brother, at the river Metaurus, and the loss of his army, compelled Hannibal to confine himself to the mountainous peninsula of Bruttii, where for four years he resisted all the efforts of the Romans to dislodge him. At length, after having maintained himself in Italy for upward of fifteen years, he was recalled to Africa, to defend his country against Scipio; but notwithstanding his utmost exertions, and the bravery of his veteran troops, he was defeated by Scipio near Zama, with a loss of 20,000 men (B.C. 202). Peace was concluded in the following year (B.C. 201).

Hannibal's scheme had been baffled, but his hatred of Rome was not diminished, and he set himself to make preparations for a still more deadly struggle. He turned his attention in the first place to political reforms, and made some constitutional changes by which he placed the finances on a better footing. But his enemies accused him to the Romans of stirring up Antiochus the Great of Syria to make war on them, and when ambassadors came to Carthage Hannibal fled to the Court of Antiochus at Ephesus. In the war which followed he took no conspicuous part, but the King bitterly regretted afterwards that he did not take the advice of Hannibal to carry the war into Italy. When peace was concluded, the surrender of Hannibal was one of the conditions; but, foreseeing such a result, he fled to Prusias, King of Bithynia, for whom he gained a naval victory over Eumenes, King of Pergamus. He was at length demanded by the Romans, and, seeing no hope of escape, he took poison, which he always carried with him for such an emergency. The date of his death was probably B.C. 183.

Our information about Hannibal is derived largely from Livy, Polybius, Plutarch, Appian, Cornelius Nepos, and Tonaras. For an estimate of the man, see Morris, *Hannibal* (1897); for an account of his military operations, Dodge, *Hannibal* (1891).

HAN'NINGTON, JAMES (1847-85). An English missionary, first Bishop of Eastern Equatorial Africa, born at Hurstpierpoint, near Brighton. He was educated at Oxford, and entered the ministry of the Established Church. In 1882 the Church Missionary Society sent him out to reënforce the missionaries already in Uganda, but his health gave way, and he was compelled to go back to England. Two years later he was consecrated Bishop of Eastern Equatorial Africa, and started a second time for Africa. After having conquered the many obstacles and perils which he encountered in his attempt to reach the interior, he was murdered by the command of Mwanga, King of Uganda, near Lake Victoria Nyanza. Consult Dawson, *James Hannington, First Bishop of Eastern Equatorial Africa* (London, 1887).

HAN'NO (Phœnician, merciful) (c.755-c.715 B.C.). A King of Gaza. He is called Hanunu in the inscriptions of the Assyrian King Tiglath-pileser III.; and this name is identified with that of the Carthaginian family, who possibly were his descendants. He was situated between Assyria and Egypt, and in 732 rebelled against Tiglath-Pileser, but fled without giving battle. Against Sargon II. he allied himself with Sabaco (biblical So), King of Egypt; was defeated with him at Raphia (720) and carried into captivity.

HANNO. A common name among the Carthaginians. The earliest of note who bore the name was a Carthaginian admiral who was sent on a voyage of discovery and colonization along the west coast of Africa, which he explored as far as the modern Sierra Leone. The date of this expedition is not known, but is supposed to be about B.C. 570. He founded a number of towns, and on his return he deposited an account of his voyage in the Temple of Moloch. This account was translated into Greek; and the translation, known as *Ἀννωνος Περίπλους*, or *Voyage of Hanno*, is still extant. There is an old English translation by Falconer (London, 1797). Consult Mer, *Mémoire sur le Périple d'Hannon* (Paris, 1888).—HANNO (?-B.C. 264). A Carthaginian admiral in the first Punic War. In command of a Carthaginian fleet, near Messana, Hanno allowed the city to fall into the hands of the Romans. He was recalled and executed.—HANNO (third century B.C.). A Carthaginian general, successor in command to the above. He was the son of a Hannibal; with Hiero II. besieged Messana, but was defeated by the consul Appius Claudius.—HANNO (c.300-c.250 B.C.). A Carthaginian general in the First Punic War. He was defeated near Agrigentum in 262. In 256, with Hamilcar, he was defeated in a naval battle off Ecnomus.—HANNO THE GREAT (c.275-c.195 B.C.). A Carthaginian politician. At the outbreak of the revolt of the Carthaginian mercenaries he was put in command of the army, but was so badly defeated that Hamilcar Barca was sent out to share the command with him. The two agreed so ill that the home Government decided on a single command, but left the choice to the army in the field, which chose Hamilcar. Hanno tried to break down Hamilcar's power, after his death opposed intrusting the chief command to Hannibal, urged the surrender of Saguntum to Rome, and was head of the peace party. At the close of the Second Punic War he became leader of the party which was friendly to Rome.—HANNO (last half of third century B.C.). A Carthaginian lieutenant of Hannibal. He was in command of the left wing at the battle of Cannæ; conquered several towns in Lucania and Bruttium, and was beaten by Tiberius Gracchus (B.C. 214) near Beneventum.

HANOI, hä'nô-ē' (Chin. *Ho-nei*, within the river). One of the most important cities of Annam, capital of the Province of Tongking, and the seat of the government of French Indo-China (Map: French Indo-China, E 2). It is picturesquely situated in a region of lakes and trees, on the right bank of the Songkoi or 'Red River,' which rises in the Chinese Province of Yun-nan, and enters the China Sea 110 miles below Hanoi. The native town lies between the citadel and the river. The streets are fairly wide

and the houses good, many of them being of brick and well built. Since coming under French control the part nearest the water front has been much improved; new wide streets lined with trees have been opened, lighted with electricity. They have been given French names, and in this part the principal shops and hotels are found. French missionaries have long resided here, and a two-towered cathedral is a conspicuous feature of the landscape. In the middle of this newer part of the city is a small island, with some quaint pagodas; and on the shore of Grand Lake, in the neighborhood of the city, is a Buddhist temple with a colossal bronze figure of Buddha. In the space near the water-front is a bronze statue of Paul Bert, unveiled July 14, 1900. Hanoi was fortified by French officers at the beginning of the nineteenth century, but the defenses are now of little importance. The citadel, which stands on higher ground than the rest of the city, is a quadrilateral of 3600 feet to a side, and is surrounded by a wall and a deep moat. Within this inclosure are the palace, the royal pagoda, public offices and official residences, the treasury, court of justice, barracks, arsenals, magazines, etc. The principal trade is in silk and rice, and is largely in the hands of the Chinese, and embroidery and pearl-work form important industries. The Songkoi is navigable at all seasons as far as Hanoi by vessels drawing eight or nine feet. Above that point the river is shallow, and there are many rapids, but flat-bottomed vessels drawing not more than three and one-half feet can ascend quite a distance. Haiphong (q.v.) is the port of Hanoi, which is connected with it by rail as well as with Langson on the Chinese frontier. Several French newspapers are published in Hanoi, and a new race-course was opened there in 1890. The population in 1897 was 102,000, of whom 950 were Europeans and 1697 Chinese.

HANOTAUX, ä'nō'tō', Gabriel (1853—). A French historian and politician, born at Beaurevoir, Aisne. From being a specialist in paleography and modern history, he passed into the civil service (1879), as director of the historical department in the national archives, and became in 1881 sub-chief of Gambetta's Cabinet, and later chief of that of Jules Ferry. In 1885 he was Counselor of Legation at Constantinople, and the following year he was elected Deputy for Aisne. He served in the Chamber till 1887, and was mainly conspicuous for his opposition to Boulanger. He was appointed Director in the Ministry of Foreign Affairs in 1892, and in May, 1894, became Minister of Foreign Affairs in the Dupuy Cabinet, remaining in office through several changes of Premiership, till October, 1895. In the Méline Ministry (1896-98) he again held the portfolio of Foreign Affairs. In 1897 he was elected to the Academy. Among his published works are: *Les villes retrouvées: Thèbes, Ninive, Babylone, Troie, Carthage, Pompéi, Herculanum* (1880); *Origines de l'institution des intendants des provinces* (1884); *Henri Martin, sa vie, ses œuvres, son temps* (1885); *Etudes historiques sur le XVIème et le XVIIème siècle en France* (1886); *Le recueil des instructions données aux ambassadeurs à Rome* (1888); *Histoire du cardinal de Richelieu* (1893-96); *La France et la royauté avant Richelieu* (1898); and *La Seine et les quais Promenades d'un bibliophile* (1901).

HANOTEAU, ä'nō'tō', Hector (1823-90). A French landscape painter, born at Decize (Nièvre). He was a pupil of Gigoux, and constantly exhibited at the Salon. His works are characterized by sturdy realism and skillful color. They include "The Village Pond," "The Frogs," and "The Water Lilies," all in the Luxembourg. He also painted portraits. He was awarded medals at the Salons of 1864, 1868, and 1869, a first-class medal at the Paris Exposition of 1889, and the Legion of Honor in 1870.

HAN'OVER, Ger. **HANNOVER**, hä-nō'vēr. A former kingdom of Germany, constituting since 1866 the most northwestern province of Prussia (Map: Prussia, C 2). The North Sea and the Elbe River border the region on the north and northeast, the Prussian Province of Saxony and Brunswick on the east, the Prussian provinces of Hesse-Nassau and Westphalia on the south and southwest, and Holland lies on the west. Hanover nearly surrounds the Grand Duchy of Oldenburg. It embraces the old Brunswick-Lüneburg possessions, together with the principalities of Hildesheim, East Friesland, Göttingen, Osnabrück, etc. Area, 14,869 square miles.

Geographical Features. The general physical character of Hanover is that of an extended alluvial plain with slight undulations—the western continuation of the great low plain of Northern Germany. In the south, however, the country is mountainous, embracing a considerable part of the western Harz (reaching a height of about 3350 feet), together with the lesser heights of the Eichsfeld, and other mountain ranges. The mountains are covered with dense woods. The valleys between the mountains are fertile, with a good clayey loam, and well adapted to agriculture. Beyond the valleys, toward the north, the country is traversed from northwest to southeast by a sandy tract from 50 to 80 miles in width known as the Lüneberger Heide, which is almost wholly unfit for agricultural purposes. Toward the northwest from the mountain region extend elevated levels, characterized by heaths and other dry areas. Great marshes, peat-moors, 'floating-fields,' cover the northwestern and extreme northern districts of the province. These sections have in some parts been successfully drained and fertilized and furnish good pasture, but a large portion is still unreclaimed, and is regarded as one of the least productive parts of Germany. The morass of Bourtange, on the borders of Holland, alone covers 500 square miles. The coast, partaking of the nature of the Holland coast, is low, and requires protection from the overflowing of the 'German Friesland,' the land being in many localities below the level of the sea. Along the banks of the rivers and adjoining the dike-protected coast are very fertile and highly cultivated districts. The principal rivers are the Elbe, which receives several affluents from the southwest; the Weser, on whose affluent, the Leine, is situated the capital, Hanover, and among whose other tributaries are the Aue, the Emmer, and the Aller; the Ems; and the Vechte—all falling into the North Sea. There are only two considerable lakes, the Dümmersee and the Steinhuder Meer.

Climate and Mineral Resources. The climate is damp near the ocean, where fogs and heavy winds are frequent; in the south it is drier and colder, being bleak in the Harz in

winter. In the vicinity of the moors fevers are prevalent, and the mortality is high. The mean annual temperature is about 47° F. The mining industry is important, and is carried on mostly in the Harz region. The chief minerals are coal and iron, of which about 650,000 tons each are mined annually. Silver, lead, and copper are also mined, while salt products are prominent. Turf and peat are large and important outputs, being shipped up the streams and canals toward the interior for use as fuel. Some mineral oil is found.

Agriculture. About one-third of the total area of the province is under tillage—farm and garden—a little over one-fifth is under pasture, and nearly one-sixth under forest. According to the census of 1895, there were 345,159 land holdings, with a total area of 7,192,500 acres. Of these, 200,870 holdings covered less than 5 acres each; 66,240, from 5 to 12½ acres each; 55,869, from 12½ to 50 acres each; and 22,180, over 50 acres each. In the drier regions of the country rye is the prominent crop; in the marsh and moor districts, wheat, oats, barley, buckwheat, rape, and potatoes are grown. Cattle-raising is an important industry. For wheat and oats Hanover is one of the leading regions in Germany. In the mountain valleys the farming is intensive, and fruit is the leading product. The sugar-beet industry is rapidly growing; the number of factories was 43 in 1900. Clover, hops, flax, and tobacco are raised. The number of head of stock in the province generally increased about 10 per cent. during the decade from 1890 to 1900, the sheep holdings alone having fallen off.

Manufactures and Commerce. The manufacturing industries are prosperous and growing, especially in the southern part of the province. The industrial census of 1895 gives the number of industrial establishments as 158,756, employing 418,837 persons, or about 16 per cent. of the population. In that number were included 67,058 establishments without any help and 1181 establishments employing 150,487 hands. Among the chief manufactured products are cotton and woolen textiles, machinery, wagons, leather, glassware, cigars and tobacco, paper, chemicals, and spirits. Shipbuilding is a prominent industry. There are several Chambers of Commerce that actively further the interests of manufacturing and agriculture. The commerce is extensive, Hanover ranking among the thirteen leading commercial towns of Prussia. Trade is greatly facilitated by the numerous splendid waterways of the province, as well as by its ample roads and railways, the last exceeding 1500 miles in length and belonging for the most part to the State. The Province of Hanover has about 40 ports, of which six are important shipping centres, including Harburg and Geestemünde. The Hanoverian shipping trade owned in 1900 about 850 boats, which had, however, a light tonnage—56,000.

Government and Instruction. For purposes of administration Hanover is divided into the six counties of Hanover, Hildesheim, Lüneburg, Stade, Osnabrück, and Aurich, which are divided into 78 circles. The province is represented by 36 members in the Prussian Chamber of Deputies and by 10 in the Upper House. It sends 19 members to the German Reichstag. In educational matters Hanover holds high rank. Education is free, compulsory, and thoroughly diffused. There are over 100 secondary schools and other schools of advanced instruction. There is also the famous university at Göttingen (q.v.). Among the practical schools are the royal mining academy in Clausthal, the building school in Nienburg, and the forestry school in Münden. There are a technical high school (in the capital), five navigation schools, several agricultural institutions, a school for the cultivation of meadows, a veterinary high school, and several unions for the diffusion of practical knowledge, as well as various associations fostering the interests of science, art, history, natural philosophy, engineering, and architecture. There are two large libraries: that of Göttingen University, and the Royal Library in the capital. The Royal Theatre of Hanover holds a creditable rank in Germany.

Population. The population of the province was 2,422,020 in 1890; in 1900, 2,590,336, of whom 2,227,816 were Protestants. The population per square mile was 174.2 in 1900. There were 1784 emigrants in 1900, nearly all to the United States.

HISTORY.

The early history of Hanover is that of Brunswick. In 1235 Otho, the grandson of Henry the Lion, of the famous House of Guelf (Welf) was recognized as Duke of Brunswick by the Emperor Frederick II. On the death of Ernest the Confessor, Duke of Lüneburg, in 1546, his dominions were divided between his sons, Henry, who became the founder of the Brunswick-Wolfenbüttel line, and William, who founded the new line of Brunswick-Lüneburg. (See Brunswick, House of.) Several divisions were made among the members of this family, the most important of which occurred in 1635, when George, the son of William, received the principalities of Calenberg and Göttingen, and took up his residence in the city of Hanover. Duke George died in 1641, and was succeeded by his son, Christian Louis, who in 1648 succeeded to the possession of Lüneburg, transferring Calenberg to his brother George William. In 1665 George William in turn secured Lüneburg, and Calenberg fell to the possession of his younger brother John Frederick, who was succeeded by still another brother, Ernest Augustus, in 1679. This prince introduced the law of primogeniture into the succession of the principality in 1683, and in 1692 secured the electoral dignity for his house from the Emperor Leopold I., becoming Elector of Hanover. He married Sophia, the daughter of Elizabeth, wife of the Elector Palatine, Frederick V., and the granddaughter of James I. of England, thus connecting the Hanoverian house with that of England and Scotland. Their son, George Louis, succeeded his father in the Duchy of Calenberg and in the electoral dignity in 1698, and, by marrying his cousin Sophia Dorothea, he united the two duchies of Calenberg and Lüneburg, on the death, in 1705, of George William. In 1714, on the death of Queen Anne, George Louis, Elector of Hanover, ascended the throne of Great Britain as George I. (q.v.), being the nearest Protestant heir, through his mother, the Electress Sophia. With George, a brighter epoch opened for the inhabitants of Hanover, who were relieved from the burden of maintaining the court and ducal household, while the revenues of the Crown were thenceforth appropriated solely to

the general purposes of the State. The secularized sees of Bremen and Verden were obtained in 1715 by purchase from Denmark. George II., who succeeded in 1727, participated in the War of the Austrian Succession as an ally of Austria. In the Seven Years' War, however, during which Hanover suffered materially at the hands of the French, who were the allies of Austria, he sided with Prussia. This King founded the University of Göttingen in 1734. The first thirty years of the reign of George III. (q.v.) of England, who succeeded to the Electorate of Hanover on the death of his grandfather in 1760, contributed largely toward the prosperity of the electorate. Like the other States of Northern Germany, Hanover profited by the increased English and American trade, for which the Hanoverian ports and rivers formed the regular channels of communication with the rest of Germany. In 1793-95 Hanoverian troops took part in the wars against the French Republic, but the expense of their maintenance was defrayed by England, and it was not till 1801, when Prussia, refusing to acknowledge the neutrality of Hanover, threw troops into the electorate, that Hanover suffered from the consequences of the anomalous position in which its relations to England placed it with regard to the other States of Germany. The Prussian troops evacuated Hanover in the following year, in accordance with the treaty entered into between France and England. In 1803, when war was renewed between the two powers, Napoleon threw an army, under the command of Mortier, into Hanover, and the result of this measure was to compel the Hanoverian Government to enter into a convention by which it bound itself to abstain from taking part against France during the pending war; to give up fortresses and munitions; to subsidize French troops; and to participate unconditionally in the general costs of the war. In 1807, Napoleon, after having ceded Hanover to Prussia, and again withdrawn it, appropriated a portion of the electorate to complete the newly formed kingdom of Westphalia, which in 1810 received the whole of the Hanoverian territory. Later in 1810 a portion of Hanover was united with France, and divided into the departments of Bouches de l'Elbe, Bouches du Weser, and Leine. After the expulsion of the French, Hanover was handed over to George III., November 4, 1813. The Congress of Vienna raised Hanover to the rank of a kingdom and granted it important territorial additions.

In 1816 the Duke of Cambridge, brother of the Prince Regent of England, became Governor-General of Hanover; and in 1819 a new constitution was granted, providing for two representative chambers. The Government remained largely autocratic, however, and the influence of Count Münster was paramount in Hanoverian affairs. Very little was done toward the improvement of the administration, and when William IV. ascended the throne in 1830, the general disaffection and distrust had risen to the highest pitch. The influence of the July Revolution extended to Hanover, and in 1831 disturbances broke out at Osterode and Göttingen. These were speedily put down, but as the national discontent did not abate, Count Münster was dismissed, and the Duke of Cambridge, who had hitherto acted as Governor-General, was invested with the title of Viceroy, and intrusted with very extensive powers. The Duke recommended gradual reforms, but as the popular feeling was decidedly in favor of a thoroughly remodeled constitution, the Estates were convoked, and in September, 1833, a new organic instrument was promulgated. The death of William IV., in 1837, placed Hanover under the rule of the next male heir, Ernest Augustus, Duke of Cumberland, son of George III. One of the first measures of the new King was to abrogate the Constitution of 1833, to which he had from the time of its adoption refused his assent, and to restore that of 1819. In consequence of their refusal to take the oath of allegiance required from all persons holding office under the State, seven of the professors at Göttingen, among them Dahlmann, Ewald, Gervinus, and the brothers Grimm, were expelled from the university. In 1840 a new constitution was promulgated; but its limited concessions failed to satisfy the demands for a thoroughly constitutional government. From this period till 1848, when the success of the French Revolution compelled the German rulers to adopt a more liberal policy toward their subjects, the King showed himself resolutely averse to reform, though the Hanoverian people themselves were strongly in favor of the Constitution of 1833. Only the danger of a revolution in 1848 forced the King to grant a constitution more liberal in nature than even that of 1833. The danger once over, however, he reverted to his former policy and dismissed his liberal Ministry. A revolution was prevented by his death in 1851. Ernest Augustus was succeeded by his son George V., who, though blind, was active and energetic. He cherished high ideas of the royal power and favored the claims of the aristocracy. The early measures of the new King were not calculated to allay the fears entertained of his policy; but the decisive declaration of the Chambers that they were desirous of seeing the reforms completed which had been begun by the late King, and their expression of want of confidence in the new Cabinet, prevented any marked retrogressive movement on the part of the Ministry. In 1854 Hanover joined the German Zollverein. In 1855 the Constitution underwent various modifications in accordance with the demands of the federal Diet, by which it was made to approximate more closely to that granted by Ernest Augustus in 1840. Although the changes were unpopular, they met with no energetic opposition. In the war of 1866 Hanover threw in her lot with Austria, and in June the kingdom was occupied by Prussian troops, and on the 28th of that month the Hanoverian army was forced to capitulate. By the Peace of Prague the incorporation of Hanover with Prussia was recognized. Both George V., who died in 1878, and his son, Ernest Augustus, Duke of Cumberland (q.v.), refused to acknowledge the act of annexation, and went into exile. On this account, their private estates in Hanover were sequestrated by Prussia, the proceeds being denominated the Guelph Fund (q.v.). The Hanoverian Deputies kept up a constant protest in the Reichstag against the annexation, but finally, in 1892, Ernest Augustus renounced any intention of intriguing against Prussia, and the income of the Guelph Fund was handed over to him.

BIBLIOGRAPHY. Guthe, *Die Lande Braunschweig und Hannover* (Hanover, 1888); Meyer,

Die Provinz Hannover (ib., 1888); Ringklib, *Statistisches Handbuch der Provinz Hannover* (6th ed., ib., 1897); Havemann, *Geschichte der Lande Braunschweig und Luneburg* (Göttingen, 1853-57); Grotefend, *Geschichte der Verfassung des Königreichs Hannover, 1814-48* (Hanover, 1857); Oppermann, *Geschichte Hannovers von 1832 bis 1860* (Leipzig, 1860-62); Köcher, *Geschichte von Hannover und Braunschweig, 1648-1714* (Leipzig, 1884-96); Heinemann, *Geschichte von Braunschweig und Hannover* (Gotha, 1884-92); Meding, *Memoiren zur Zeitgeschichte* (Leipzig, 1881-84); Sybel, *Die Begründung des deutschen Reichs durch Wilhelm I.* (Munich, 1893; translated New York, 1890-92). See GERMANY.

HANOVER. The capital of the Prussian Province of Hanover (q.v.), formerly the capital of the Hanoverian kingdom, situated in a low, level region, on both sides of the Leine, which here becomes navigable, in latitude 52° 22′ N., and longitude 9° 45′ E. (Map: Prussia, C 2). Its area is over 16 square miles. The mean annual temperature is 48.5° F.—January 34.2°, July 65.4°; average rainfall 22.61 inches.

Hanover is composed of the Altstadt (old town), the Aegidien-Neustadt, the Calenberger-Neustadt (dating from the thirteenth century), inclosed by the Leine and its little tributary the Ihme, and a number of suburbs. The town of Linden lies beyond the Ihme. Fifteen river bridges facilitate the communication between the various sections of the city. The environs abound with spacious parks and promenades which ennoble the city and justify its fame for dignified beauty. The Eilenriede—the city forest (about 1650 acres)—adjoins the town on the east, and contains the zoölogical gardens. The magnificent wide Lindenallee, about one and one-half miles long, is celebrated, as well as the Grosse Garten, laid out by Le Nôtre and richly adorned with statues, etc. The Herrenhausen Castle, with its parks, its great fountain, and its rare collection of palms, is visited by all tourists, as is also the fine adjacent mausoleum containing monuments to Ernest Augustus and his Queen, by Rauch. In the oldest portion of Hanover are found many houses dating from the fifteenth and sixteenth centuries, with stucco façades. The newer parts of the city are generally modern in appearance, being handsomely built of stone and brick, and profusely adorned with monuments, fountains, etc. Among the conspicuous recent edifices are the magnificent municipal buildings, such as the railway station and the new Rathaus. The most venerable church in Hanover is the fourteenth-century brick Marktkirche, situated in the centre of the old town. It has a tower 300 feet high, and contains some fine stained glass and a carved altar. The Gothic Ægidienkirche, dating also from the fourteenth century, with a Renaissance tower, the modern Christuskirche with its fine stained glass, the Roman Catholic Marienkirche, and the old Nikolaikapelle, are the other noteworthy ecclesiastical edifices. In the churchyard of the Gartenkirche lies buried Goethe's famous Lotte (Charlotte Kestner), whose family has long been identified with Hanover.

Among the secular buildings the most prominent are the Royal Palace, originally constructed in the seventeenth century, and rebuilt in 1817, with its majestic colonnade, its fine chapel containing a beautiful altarpiece by Cranach, and interesting frescoes; two other royal palaces associated with the history of the reigning families of Hanover and England, among them the old palace of George V., which was the favorite palace of George I. and George II. of England, and now used as a town hall; the splendid old late-Gothic Rathaus, built in 1439-55 and recently restored, with a frescoed Ratskeller by Schaper, and a bronze Gothic fountain in front; the Royal Theatre, completed in 1853, with an attractive façade decorated with statues of famous dramatists and composers, and, in the foreground, a statue of Marschner, formerly conductor of the Hanoverian Royal Orchestra; the provincial museum; the Kestner museum; and the barracks, situated on the Waterlooplatz. This square is adorned by the Waterloo Column, surmounted by a figure of Victory, erected in 1826-32 in honor of the Hanoverians who fell at La Haye Sainte. Among the numerous monuments in the city are the fine bronze equestrian statues of King Ernest Augustus, by A. Wolff; the imposing war monument (one of the best in Germany) by Voltz, dating from 1884, with symbolic figures of Germania and Hanover; and Dopmeyers's famous artistic "Goose-girl fountain." Another object of interest is Leibnitz's house, recently restored by Haupt.

The city is a well-known educational centre, and a favorite place of residence for foreign families, who are attracted not only by the pleasant and quiet charm of the capital, but by the purity of the German spoken there. The educational establishments comprise a school of technology (one of the four in Prussia), having various interesting collections, and an attendance of nearly 1500; a veterinary high school (one of the two in Prussia), founded by George III. of England in 1778; several seminaries for teachers; a decorative art high school; and a number of lyceums and military and industrial schools. The Royal Library contains over 200,000 volumes and 3500 manuscripts. The municipal library is also rich in manuscripts. The new provincial museum has among its various treasures an important collection of pre-Christian antiquities, two picture-galleries of minor interest, including both ancient and modern canvases, and some statuary by Canova and Rauch. The Kestner Museum contains Egyptian and Roman antiquities, old manuscripts and incunabula, the famous Eulemann collection, paintings, miniatures, etc. The Royal Theatre, with seats for 1800, is one of the leading theatres of Germany of the second rank. There are two good private theatres. The city has a celebrated military riding-school, and numerous scientific, historical, art, and art-industrial organizations, as well as important hospitals and charity homes.

The city, as the capital of the Province of Hanover, is the seat of the Presidency and the higher courts. The administration of the city is in the hands of a director, a syndic, an executive board of fifteen senators or magistrates, and a municipal council of 24 members. The city is lighted by electricity, has an electric street railway, good water-works, and owns a market and a slaughter-house. Its budget for 1901-02 nearly balanced at about $2,100,000.

The industrial importance of the city has been greatly increased in late years by reason of the

improvement in its railway connections. It is now a railway and a manufacturing centre. Among the larger industrial establishments are an oilcloth factory, a railway repair shop, a number of machine-shops, iron foundries, iron-bridge works, piano-factories, and chemical works. There are also produced lacquer ware, books, lamps, liquors, and asphalt. Leather is an important output. The trade, which is of considerable magnitude, is actively promoted by a number of prominent commercial, agricultural, and manufacturing associations, banks, and other institutions of credit. The city is the seat of the leading industrial provincial organizations. The population of Hanover proper was 163,593 in 1890, and 235,649 in 1900—an increase of 12 per cent. It is the tenth city in size in Germany and the fifth in Prussia. The population of greater Hanover (including several adjacent towns not officially incorporated, but closely allied with the city) was 302,054 in 1900. Nearly all the population is Protestant.

HISTORY. Hanover originally was a little fishing town, and nothing is known of it worth recording until 1203, at which time Henry, the son of Henry the Lion, Duke of Saxony, received it with his share of lands left by his father. He soon handed it over to his nephew Otho, the founder of the House of Brunswick. From Duke Otho, Hanover received in 1241 a municipal charter, and soon after it joined the Hanseatic League, in which, however, it played only a minor rôle. Its importance rose after 1636, when it became the residence of one line of Brunswick dukes. (See HANOVER, Province.) In 1714, however, the Elector of Hanover became King of England, and until 1837 the city was a monotonous provincial town. Upon the death of William IV. of England, Ernest Augustus, Duke of Cumberland, the new King of Hanover, took up his residence here. In 1866 the Kingdom of Hanover was annexed to Prussia, and since then the city has been the capital of the Prussian province of the same name. Hanover has grown rapidly in recent years, and is more prosperous under Prussian rule than it ever was as the capital of an independent kingdom. Consult: Hoppe, *Geschichte der Stadt Hannover* (Hanover, 1845); Hartmann, *Geschichte der Residenzstadt Hannover* (Hildesheim, 1886); Hirschfeld, *Hannovers Grossindustrie und Grosshandel* (Leipzig, 1891).

HANOVER. A town in Grafton County, N. H., 55 miles northwest of Concord, on the Connecticut River, opposite Norwich, Vt., with which it is connected by a bridge (Map: New Hampshire, F 7). It is the seat of Dartmouth College (q.v.), and has the Mary Hitchcock Memorial Hospital. There are minor manufactures, but the town is interested mainly in agriculture, dairying, and lumbering. Population, in 1890, 1817; in 1900, 1884.

HANOVER. A borough in York County, Pa., 42 miles north by west from Baltimore, Md., on the Pennsylvania and the Western Maryland railroads (Map: Pennsylvania, E 4). It is in a productive agricultural region which also has iron-ore deposits, and is of considerable commercial and industrial importance, its manufactures including cigars, gloves, shoes, machine-shop products, and carriages. Settled about 1730, Hanover was incorporated in 1813. It is governed by a burgess, elected triennially, and a borough council. Population, in 1890, 3746; in 1900, 5302.

HANOVER COLLEGE. An educational institution situated at Hanover, Ind.; chartered as an academy in 1828, and as a college in 1833. It is under Presbyterian control, and since 1880 has admitted women. The number of students was, in 1902, 100 in the academic department, and 50 in the preparatory and musical departments. At the same time the college had a library of 17,000 volumes, an endowment of $200,000, grounds and buildings valued at $175,000, and an annual income of $14,000. No tuition fee is charged. The college provides a course for teachers and offers degrees in arts, science, letters, philosophy, divinity, and law.

HANOVER COURTHOUSE, BATTLE OF. An engagement fought at Hanover Courthouse, 17 miles north of Richmond, Va., on May 27, 1862, between a part of the Federal Army of the Potomac under General Fitz-John Porter and a Confederate brigade under General Branch, the latter, after offering a stubborn resistance, being driven from the field. The Federals lost 355 in killed, wounded, and missing; the Confederates 265.

HANOVER SQUARE. A London square, laid out in 1731. Near it stands Saint George's Church, the scene of the most fashionable London weddings.

HANSA, THE. See HANSEATIC LEAGUE.

HAN'SARD. A well-known name in connection with the printing of the British Parliamentary records. The first of the family was Luke Hansard, who was born in 1752 at Norwich, and coming to London, worked for some years as compositor in the office of Hughes, the printer to the House of Commons, and in 1800 succeeded Hughes as sole proprietor of the business, which is still carried on by his family. Competition and other causes have led to a division of the Parliamentary printing, but the Messrs. Hansard still print the bills before Parliament, the reports of committees, and some of the accounts.

The name of Hansard is connected with an important question of Parliamentary privilege. The case was briefly as follows: A bookseller named Stockdale brought an action for libel against the Hansards, the libel consisting of statements in the Parliamentary reports which the latter had printed, and Lord Chief Justice Denman decided in favor of Stockdale. This decision seemed to violate the clause in the Bill of Rights that "debates and proceedings in Parliament ought not to be impeached or questioned in any court or place out of Parliament." A committee of the Commons reported that Parliament, and each House, had a right to authorize the publication of such matter as it believed to be for the public good, and further that to call this right in question was contrary to law and a breach of privilege of the House. The right to publish must necessarily carry with it the right to protect the publishers. So the struggle began, and, before it ended, the Sheriff who served the decrees of the courts, the attorneys of Stockdale, as well as Stockdale himself, and many others, were imprisoned by the authority of the Commons. On the other hand, the property of the Hansards was seized under the decrees of the

court. After three years of strife and debate Parliament ended the anomaly of a conflict between the two departments of Government, and also did away with the antiquated methods of Parliamentary redress, by enacting a law that any proceedings against persons for publication of papers printed by order of either House of Parliament are to be stayed by the courts of law, upon delivery of a certificate and affidavit that such publication is by order of either House.

The Hansards are, however, most widely known by the reports of the debates in Parliament, which are published by them and bear their name. The accuracy of these reports is rarely questioned. They are not, however, prepared by shorthand reporters employed by the Hansards, but are compiled from the reports in the London newspapers, and then submitted to the speakers for correction. The speeches as they appear in Hansard are not, therefore, in all cases the spoken words, but frequently are the product of the closet, the reviser inserting in many cases what he intended to say, or wished he had said, and omitting the heated passages which he regretted to have uttered. Cobbett's—often called Hansard's—*Parliamentary History* (1066-1803) in 36 volumes furnishes the most complete available record of its proceedings during these centuries. Since 1803 the Hansards have published the debates of Parliament in four series: (1) 1803-20, in 41 volumes; (2) 1820-30, in 25 volumes—an index of the whole forming an extra volume; (3) 1830-91, in 356 volumes; (4) the present series: begun in 1892, by 1900 76 volumes had been published. The executive Government takes a certain number of copies of *Hansard* for distribution among the public offices and departments. Many peers and members of Parliament, foreign governments, and public libraries, also subscribe to this work, which is issued at a certain fixed price, which the Messrs. Hansard guarantee, at the commencement of each session, shall not be exceeded.

HANSCH, hänsh, Anton (1813-76). An Austrian painter, born in Vienna. He was a pupil of Mössmer at the Academy of Vienna, and afterwards traveled and studied in Germany, Belgium, Switzerland, and Italy. His works consist of landscapes remarkable for composition and careful detail. Notable pictures are: "Region Bordering on the Königsee" (1849); "The Jungfrau in Switzerland" (1853); "Under the Linden Trees on the Shore of Chiem Lake" (1858), all in the Vienna Museum; "The Lake of Constance," "Firwood in the Salzkammergut" (Vienna Academy); "From the Wilderness of Styria," "At Bernina Pass," "After the Storm," and "The Wetterhorn."

HAN'SEAT'IC LEAGUE, or **HAN'SA**, The (from OHG. *hansa* [*hanse*], Goth. *hansa*, AS. *hōs*, league). A union established in the thirteenth century by some of the cities of Northern Germany for their mutual safety and for the protection of their trade. This union grew out of associations of German merchants organized abroad. In order to travel and trade with greater security, these had long been accustomed to band themselves together into companies; and through such associations had secured privileges in certain cities, notably in London, Novgorod, Bergen, in Norway, Bruges, and Wisby, in Gothland, off the coast of Sweden. In London the merchants of Cologne had obtained a letter of protection as early as 1157, and other German merchants who resorted to London joined the Cologne Hanse. When Lübeck, in the thirteenth century, began to threaten the supremacy of Cologne, the merchants of the latter city endeavored to exclude the men of Lübeck from trading in England. Possibly this opposition was influential in causing Lübeck to seek allies to strengthen its position. Between 1241 and 1255 she entered into a treaty with Hamburg for the mutual protection of the commercial highway between the two cities. This alliance, which is often regarded as the origin of the Hanseatic League, resulted in putting the control of commerce in the Baltic and the North Seas into the hands of the merchants of Hamburg and Lübeck. In 1259 Lübeck, Rostock, and Wismar formed an alliance against pirates on the sea and robbers on land. In 1267 the merchants of Lübeck were allowed to form a separate hanse in London. In 1284-85 the five Wendish cities of Lübeck, Wismar, Rostock, Stralsund, and Greifswald waged war against King Eric of Denmark, and secured from him certain privileges. Before the end of the thirteenth century Cologne had been forced to take a subordinate position, and Lübeck was the recognized leader.

In the thirteenth century there were several instances of alliances formed between different groups of cities. These allied cities gradually found it advantageous to join the Lübeck union, which was constantly becoming more powerful. In 1343 it was officially designated as The Hansa. In 1362 the allies began a war against Waldemar IV. of Denmark, who had attacked Wisby in 1361, and in 1370 Denmark was compelled to conclude a treaty with the 'seventy-seven hansen,' in which the latter were guaranteed freedom to trade and an indemnity for the losses which they had suffered. In addition, it was agreed that no one in the future should receive the Danish crown without the advice of the cities and without the confirmation of the privileges of the Hanseatic League.

The entire League, which at one period embraced at least eighty-five towns, and included every city of importance between the Netherlands and Livonia, was divided at first into three, and later into four, classes or circles: (1) The Wendic cities of the Baltic; (2) the towns of Westphalia, the Rhineland, and the Netherlands; (3) those of Saxony and Brandenburg; (4) those of Prussia and Livonia. The capitals of the respective circles were Lübeck, Cologne, Brunswick, and Danzig.

The professed object of the League was to protect the commerce of its members by land and by sea, to defend and extend its commercial relations with and among foreigners, to exclude as far as possible all other competitors in trade, and firmly to maintain, and, if possible, to extend, all the rights and immunities that had been granted by various rulers to the corporations. For the promotion of these ends, the League kept ships and armed men in its pay, the charge of whose maintenance was defrayed by a system of taxation and by the funds obtained from the money fines which the Diet levied for infringements of its laws. In its factory at Bergen, in Norway, only unmarried clerks and serving men were employed, and an almost monastic discipline was enforced; but the by-laws of the

League prescribed a system of daily sports and light occupations for the recreation of the men, while judicious regulations for their comfort and cleanliness, and for the celebration of festivals at certain fixed times of the year, bear evidence of the sound sense that influenced the mode of government of the Hansa. This was further shown by the injunction to the masters of its factory to avoid everything that could hurt the prejudices of the foreigners among whom they were placed, and to conform in all things lawful to the habits of the country. At the Steelyard in London, where a German hanse was established as early as 1250, the regulations were similar in their severity to those of Bergen, and probably the customs at other factories were not far different.

For many years the Hanseatic League was the undisputed mistress of the Baltic Sea and the German Ocean. It created new centres of trade and civilization in numerous parts of Northern Europe, and contributed to the expansion of agriculture and of the industrial arts by the construction of canals and roads. It carried on trade with every European country. The greatest powers dreaded its hostility and sought its alliance, and many of the powerful sovereigns of the Middle Ages were indebted to it for most substantial benefits.

The League reached its culminating point in the fifteenth century. Its decline was rapid. In proportion as the seas and roads were better protected by the States which now arose in Europe with the passing of the old feudal anarchy, and as rulers learned to comprehend the true commercial interests of their dominions, the power of the Hansa declined. The discovery of America and of the new sea route to India gave an entirely different direction to the trade of Europe. The Hansa had, moreover, arrogated to itself, in the course of time, the right of imposing the greater and lesser ban, and of exercising other acts of sovereignty which were incompatible with the supremacy of the rulers in whose States they were enforced. Hence the League was necessarily brought into frequent hostile collision with the local authorities. In accordance with their narrow commercial policy, the Hansards refused to grant to merchants trading in foreign parts the same privileges in the Hanseatic cities which they themselves had enjoyed for centuries in England, Russia, and Scandinavia, and hence arose dissensions, which not unfrequently ended in a fierce maritime warfare. By way of retaliation for the pertinacity with which the League refused to grant to the English the same immunities which had been accorded to traders of other nations, the English Parliament required that Germans should pay the tax on wool and wine which was exacted from all other foreigners in the English markets; and although the Hansards strongly resisted, they were at length condemned by the courts, in 1469, to pay a fine of £13,500. They would probably have lost all they possessed in England if their cause had not been advocated by Edward IV., who had more than once been indebted to them for money and aid, and who in 1474 secured for them, by a clause in the Treaty of Utrecht, a restitution of nearly all their former rights in England. In 1598 their obstinacy in insisting upon the maintenance of their old prerogatives, notwithstanding the altered condition of the times, drew upon them the anger of Queen Elizabeth, who dispatched a fleet under Drake and Norris to seize upon the ships of the Hansa, sixty-one of which were captured. At the same time she banished the Hansards from their factory in London. These measures had the desired effect of compelling the League to receive English traders on equal conditions, and thenceforward the Hansards were permitted to occupy the Steelyard, as before. The Hansa had, however, outlived its usefulness, and at the Diet held at Lübeck, in 1630, the majority of the cities formally renounced their alliance. Hamburg, Lübeck, Bremen, and for a short time Danzig, remained faithful to their ancient compact, and continued to form an association of free republics, which existed unchanged until 1810, when the first three were incorporated in the French Empire. In 1815 they became members of the German Confederation. By a convention concluded in July, 1870, the powers and privileges of the three free towns were reëstablished and reorganized, and under the new German Empire they still retain their self-government. Consult: Sartorius, *Geschichte des hanseatischen Bundes* (Göttingen, 1802-08); Barthold, *Geschichte der deutschen Hansa* (Leipzig, 1854); *Hansische Geschichtsblätter* (Leipzig, 1871 et seq.); *Hansische Rezesse* (21 vols., Leipzig, 1873-99); Lindner, *Die deutsche Hansa* (Leipzig, 1901); Helen Zimmern, *The Hansa Towns* (New York, 1889).

HANSEMANN, hän'se-mân, David Justus Ludwig (1790-1864). A German publicist and statesman, born at Finkenwerder, near Hamburg. He set up as a wool-dealer at Aix-la-Chapelle in 1817, and after having attained considerable reputation in commerce and through railway construction, was elected a Deputy in the Provincial Diet of Rhenish Prussia in 1845. In 1847 he was elected a member of the United Diet, in which he became conspicuous as a leader of the Liberal Opposition, and in 1848 he was for a brief period Prussian Minister of Finance. He was the founder of the Diskontogesellschaft of Berlin, one of the most important financial institutions of Germany. His published works deal with economic and political topics of his time, and include: *Preussens wichtigste Eisenbahnfrage* (1837), and *Das preussische und deutsche Verfassungswerk* (1850).

HANSEN, hän'sen, Gerhard Henrik Armauer (1841—). A Norwegian physician, born at Bergen. He is known chiefly as the discoverer of the bacillus of leprosy. He received his early education in the cathedral schools of his native city, and on the completion of his medical studies became resident physician in the Rigshospital of Christiania. Later he spent some time as medical officer at the great Lofoten fisheries. In 1868 he was made assistant medical officer to the Bergen Leper Hospital, of which Danielssen was director. It was under the influence of this teacher that Hansen began his lifelong study of leprosy. Hansen's first investigation was to work out the significance of the 'leper cells' of Virchow. After more study in various universities, he returned to Norway to resume his investigations of leprosy. His researches pointed to the contagious and specific nature of the disease, and in recognition of the value of his work the Medical Society of Christiania voted a sum of money to enable him to continue his studies.

In his journeys about the country he came across instances of the disease which were explainable only by the theory of contagion. The conclusions at which he thus arrived conformed with those of Drognat-Landré, who had studied leprosy in Surinam, and who had published his views in 1869. Hansen's further labors were rewarded by the discovery of a bacillus in unstained preparations. Later the micro-organism was stained, and became known as Hansen's bacillus. This was in 1873. Subsequently Hansen for years tried to cultivate and inoculate the leprosy bacillus, but his efforts were unsuccessful. Nevertheless, legislation called forth by Hansen's proof of the contagious nature of leprosy has effected a marked diminution of the disease throughout Norway.

HANSEN, Hans Christian Peter (1840—). A Danish critic, born at Copenhagen. Noted as a journalist and critic, he became editor of *Nær og Fjern* (1872-80), a high-class newspaper, afterwards called *Illustreret Tidende*, which he also edited from 1880 to 1884. He made a Danish rendering of Goethe's *Faust* (1881-89), and his original publications include: A romance, *Kristian Kjøbenhavner* (1882); an illustrated history of Danish literature, *Illustreret dansk Literaturhistorie* (1886); and a history of the Danish theatre, begun in 1889.

HANSEN, Maurits Christopher (1794-1842). A Norwegian poet and novelist, born at Modum. He was a teacher, and prepared numerous text-books, but is best known by his novels. They were the first accurately to describe the life and surroundings of the small towns of his own country, and were very popular. They include: *Luren; Den gale Christian;* and *Bjergmanden.* After his death a collection of them was made by Schwach (8 vols., Christiania, 1855-58). A further selection, *Noveller i Udvolg,* was printed at Christiania in 1882. Hansen also wrote a volume of poems, *Digtninger* (1816).

HANSEN, Peter Andreas (1795-1874). A German astronomer, born in Schleswig. He was employed by Schumacher, director of the Altona observatory, to assist in the measurement of an arc of the meridian in Holstein. In 1825 he succeeded Encke as director of the observatory of Seeberg, near Gotha, where he remained for the rest of his life. He devoted his attention chiefly to the lunar theory, and his *Tables de la Lune* (1857) were so excellent that they were awarded a prize of £1000 by the British Government, and were published at its expense. The tables have been adopted for use in the calculations of the various astronomical ephemerides and nautical almanacs. Hansen was also the author of a large number of papers relating to the determination of the orbits of comets and planets. Hansen was a foreign member of the Royal Society of England, and an associate of the English Royal Astronomical Society, and was on two occasions awarded their gold medal for his research work in astronomy and his lunar tables. He will rank for all time as one of the first mathematical astronomers of the nineteenth century.

HANSEN, Theophilus von (1813-91). A Danish architect, born in Copenhagen. He studied in the Copenhagen Academy, and for further training traveled extensively in Italy and Greece. At Athens he practiced his profession to some extent, until the Revolution of 1843 compelled him to withdraw to Vienna, where he was appointed superior councilor of architecture in 1869, and was for several years professor of architecture in the Academy of Fine Arts. He was an exponent of the classic Greek style, and executed numerous works at Vienna, including the Greek Church, the restored façade of the Sina Palace, the Academy of Fine Arts, the Bourse, and the Epstein Palace. Niemann and Feldegg published *Theophilus Hansen und seine Werke* in an edition de luxe at Vienna, in 1893.

HANSE TOWNS, Laws of the; also known as the Hanseatic Code. A code of maritime law, ordained for the regulation of commerce by the towns comprised in the Hanseatic League. It was established about the end of the sixteenth century, and enjoyed great authority until superseded nearly a century later by the *Guidon de la Mer* and the *Ordonnance de la Marine* of Louis XIV. It was first published in German in 1597, and in 1614 was revised and enlarged by a congress of delegates from the several towns of the League, which was held at Lübeck. It has been translated into Latin (by Kuricke) and French (by Cleirac, in *Us et Coutumes de la Mer* (Paris, 1647).

HANSLICK, häns'lik, Eduard (1825-1904). An Austrian musical critic and author. He was born at Prague, and prepared himself for the bar, studying law at Prague and Vienna. In 1849 he received his degree of doctor of law, and entered the Government service; but the attraction which music had for him gradually drew him into the career he subsequently followed. His studies under Tomaschek at Prague, and later his experiences as musical critic of the *Wiener Zeitung* (1848-49), increased his interest in music. His most prominent characteristic was an uncompromising antagonism to exaggerated and foolishly sentimental criticism in music, and his celebrated work, *Vom Musikalisch-Schönen: ein Beitrag zur Revision der Aesthetik der Tonkunst* (1854; 10th ed. 1902), is particularly severe. He was one of Wagner's most bitter opponents, and one of the last of the critics to recognize the possibilities in the new style of opera. His position with regard to the emotional content of music was, that music is incapable of conveying any meaning other than the one inherent in the tonal sequence. Few men of his day and generation exercised a more healthy or restraining influence on musical criticism and the treatment of so-called programme music than Hanslick. It has been charged that he was unsympathetic, and that his legal training precluded a true conception of the real content of music. He was for many years musical editor of the Vienna *Neue Freie Presse,* and in 1861 became professor in Vienna University, in the department of musical history and æsthetics. He was the author of many valuable treatises and works connected with his life work, among them being: *Geschichte des Konzertwesens in Wien* (1869-70); *Die moderne Oper* (1875-1900); and *Konzerte, Komponisten und Virtuosen der letzten fünfzehn Jahre* (1896). His autobiography, *Aus meinen Leben,* appeared in 1894.

HAN'SOM, Joseph Aloysius (1803-82). An English architect and inventor. He was born at York, and began to practice his profession as an

architect at Halifax in 1825. He designed and built the Birmingham Town Hall, which he completed in 1833; but he became bankrupt under the terms of his suretyship for the builders. In 1831 Hansom patented a safety cab. The modern vehicle which bears his name differs materially from the original one. After 1842 he resumed his work as an architect, ecclesiastical and domestic, chiefly for the Roman Catholic Church, to which he belonged. Among the best known of the buildings designed and erected by him are Saint Walburge's Church, Preston, Lancashire; the cathedral at Plymouth; the Church of Our Lady and Saint Philip Neri at Arundel; the Jesuit church at Manchester; the Church of Saint François de Sales, near Boulogne; and Saint Asaph College.

HANSOM CAB. A light two-wheeled, one-horse, covered carriage, with the driver's seat elevated behind. It received its name from the inventor. See CARRIAGE.

HAN'SON, ALEXANDER CONTEE (1786-1819). An American editor and politician, born in Maryland, and educated at Saint John's College, Annapolis. As editor of the *Federal Republican*, of Baltimore, he published an article in 1812 attacking the Madison Administration with such bitterness that a mob, by way of reprisal, wrecked his office. A subsequent attempt to continue publication led to renewed violence, and he and a number of friends and supporters were removed to the local jail for safety. The populace, however, made its way into the jail, wounded Hanson and others, and killed General Lingan. From 1813 to 1817 Hanson was a Federalist member of the National House of Representatives, and from 1817 until his death was in the Senate.

HANSON, LEVETT (1754-1814). An English author, born in Melton, Yorkshire. He was a lifelong friend of Admiral Nelson, with whom he went to school at Walsham, Norfolk. Hanson studied at Cambridge, but went abroad when twenty-two years old, and spent the remainder of his life there, with but occasional visits to England. He was the recipient of many foreign orders and honors, while his experience in European courts gave him opportunity to collect material for his book, *An Accurate Historical Account of All the Orders of Knighthood at Present Existing in Europe* (1803). This was dedicated to Nelson, and his *Miscellaneous Compositions in Verse* (1811) to another friend, Warren Hastings.

HANSTEEN, hän'stân, CHRISTOPHER (1784-1873). A Norwegian astronomer, born at Christiania. At first intended for the legal profession, he subsequently devoted himself entirely to the study of mathematical science. In 1814 he was appointed to the chair of mathematics in the University of Christiania, and there, in 1819, published his celebrated work on magnetism, which was afterwards translated into German under the title *Untersuchungen über den Magnetismus der Erde*, and produced a great sensation, especially in England. He made an extensive journey to Siberia, for the purpose of making magnetic observations, in the years 1828 to 1830, and returned to Europe with a large collection of facts, which were of much service in aiding to dispel the obscurity which enveloped this subject. On his return to Christiania he prevailed upon the Government to erect an observatory, fitted also for magnetic observations. Besides occupying his chair in the university, Hansteen was professor of mathematics in the school of artillery, superintended the triangulation of Norway, and helped in the reorganization of the national system of weights and measures. He published lectures on astronomy, a work on mechanics, another on geometry, several scientific memoirs, and was one of the editors of the *Magazin for Naturvidenskaberne*.

HAṆSWURST, häns'vōōrst (Ger., Hans Sausage). The conventional buffoon in old German comedy. The name first appears in 1519, and is used by Luther in his *Wider Hanns Worst* in 1541, and as the name of a peasant in a play of 1553, but first occurs in 1573 as the title of a character in comedy. The character received its conventional form and garb at Vienna, about the beginning of the eighteenth century, when Joseph Stranitzky represented it as a simple countryman of Salzburg. A bitter fight was waged against the existence of Hanswurst on the German stage, and he was defended by Lessing in his *Hamburgische Dramaturgie*.

HANTS. A colloquial name for the English county of Hampshire (q.v.).

HANUMĀN, hä'nōō-män. The sacred monkey of India, representing the god Hanumān (q.v.). See LANGUR; MONKEY; and Plate of MONKEYS OF THE OLD WORLD.

HANUMĀN, or **HANŪMĀN.** A famous monkey chief in Hindu mythology and the legends of the epic period of India, and still a favorite divinity in Hindustan. He is represented in the Sanskrit epic *Rāmāyana* (q.v.) as the special ally and friend of Rāma, and as leading the monkey hosts that helped this hero to recover his wife Sītā, who had been carried off by the demon Rāvana. The exploits of Hanumān play an important part in the account of this expedition and the great war which followed. On one occasion Hanumān bridged over the passage between India and Ceylon with enormous rocks, which he and his monkey followers threw into the sea. Adam's Bridge in the straits between the island and the mainland is still pointed out, according to tradition, as the remains of those boulders. Many other stories and curious legends regarding him are told in the *Rāmāyana*. His birth was semi-divine. His mother was a celestial nymph that had been cursed to assume a simian shape; his father was the god of the wind. Hence Hanumān is sometimes called Māruti, a child of the wind. His large face or monkey jaw is likewise accounted for in a legendary manner. The god Indra, angered at his youthful prowess, tried to slay him by the thunderbolt, but was able only to fell him and break his jaw. From this circumstance he received the name Hanumān, 'he of the (broken) jaw.' The monkey features, or mask-like face of this deified ape, whose idols are easily recognized by the prodigious tail, are familiar enough in India, and episodes taken from his history are found represented in sculpture or in painting almost everywhere in Hindustan. According to the *Rāmāyana*, he was an astute grammarian, and skilled in many branches of learning. His prowess is also recounted in the *Mahābhārata*, and a Sanskrit drama, the *Hanumān-nāṭaka*, celebrates his deeds in fourteen acts. It is not unlikely that

underneath the curious and uncouth figure of Hanumān and his monkey hosts we may recognize some representatives of the earlier and ruder civilization of lower India that may have joined forces with the invading Aryan civilization. The reverential regard paid to monkeys around the Hindu temples may, in a way, be associated also with Hanumān. Consult: Dowson, *Hindu Mythology* (London, 1879); Wilson, *Hindu Mythology* (London, 1900). See DRAVIDIANS; RĀMĀYANA. For illustration see Plate of HINDU DEITIES in the article INDIA.

HA'NUS, PAUL HENRY (1855—). An American educator, born at Hermsdorf unter'm Kynast, Silesia, Prussia. He was educated at the Wisconsin State Normal School (Platteville), and the University of Michigan, became a teacher, and in 1891 was appointed assistant professor of education at Harvard University. His publications include: *Elements of Determinants* (1886); *Geometry in the Grammar School* (1894); and *Educational Aims and Educational Values* (1899).

HAN'WAY, JONAS (1712-86). An English traveler and philanthropist, born at Portsmouth. On the death of his father the family moved to London, and in 1719 Hanway was apprenticed to a merchant in Lisbon. In 1743 he became interested in trade with the East, and journeyed through Persia, experiencing many hardships. After his return from Persia he spent five years in Saint Petersburg, at the end of which period he received a large bequest which enabled him to retire from business. He returned to London in 1750, where, excepting for two trips abroad, he spent the remainder of his life, devoting himself to philanthropy and literature. In 1756 he was one of the founders of the Marine Society, organized to train seamen for the navy, and two years later became a governor of the Foundling Hospital, where he was active as an opponent of indiscriminate relief. In 1758 he helped to found Magdalen Hospital for Fallen Women. Hanway was almost constantly employed in the promotion of important reforms, such as the protection of the infant parish poor and of child chimney-sweeps, the solitary confinement of prisoners, and the establishment of Sunday schools. He was, however, a man of many harmless eccentricities, of which his antipathy to tea-drinking was one of the most amusing, and his attack on the habit had the unique honor of drawing a reply from Samuel Johnson. It is said that he introduced the use of the umbrella in London, after thirty years of ridicule. As a writer Hanway was most prolific. Seventy-four books and pamphlets by him are enumerated, of which only one, his *Historical Account of the British Trade Over the Caspian Sea* (4 vols., 1753), which contains an account of his travels, is of any lasting value. The most of his writings were occasional in character, and were concerned largely with the reform movements in which he was interested. He also wrote several theological works, and *Common Sense: Nine Dialogues on the American War* (1775). As a reward for his public services, Hanway was appointed one of the commissioners for victualing the navy in 1762—an office which he held until obliged to resign, on account of ill health, in 1783. Consult Pugh, *Remarkable Occurrences in the Life of Jonas Hanway* (London, 1787).

HAN'WELL. A town in Middlesex, England, 10 miles west of Saint Paul's, London. It is the seat of the Middlesex County Lunatic Asylum (Map: London, E 4). It has a progressive municipality, owns a sewage farm and recreation grounds, and maintains an isolation hospital. Population, in 1891, 6100; in 1901, 10,400.

HAN-YANG, hän'yäng'. A departmental city of China, situated on the left bank of the Yang-tse, at the point where it receives the waters of the river Han, which separates it from Hankow. Its most conspicuous feature is Ta-pieh Shan, a precipitous hill crowned with ruined fortifications, from which a fine view of the surrounding country can be obtained. Commanding as it does both the Han and the Yang-tse, it early became an important military post, and the possession of Ta-pieh Shan was always an object of much interest to the contending parties in the numerous revolutions, rebellions, and wars which have characterized Chinese history from the earliest times. It received its present name in the sixth century, and while it continued to be a strong military post, its advantageous position for trade soon attracted attention, and it became a very populous and flourishing city. Notwithstanding its proximity to Hankow, this state of things continued until the Tai-ping Rebellion (1852-64), when it was almost entirely wiped out. Han-yang never recovered until Chang Chih-tung, Governor-General of Hu-kwang, selected it in 1889 for the site of the arsenal and the great steel and iron works, cotton-spinning factories, etc., which he has established there. The iron-works (begun in 1891) cover 70 acres, and include four immense hot-air blast-furnaces, several large steam hammers, innumerable rollers, and all the necessary machinery for producing everything required for the Hankow-Peking Railway, which he planned and which is now partly constructed. The sheds cover 20 acres. The coke used is obtained from Wales, but the ore needed in the manufacture of the rails is mined near Wang-shih King, 76 miles below Hankow. Both hard and soft coal are mined in the same neighborhood. The plant in Han-yang also includes a railway 1½ miles long, from the Yang-tse to the works, and thence to the Han, with an inclined plane on the Yang-tse bank, 300 feet high, up which the cars are hauled by powerful machinery. The whole is under foreign management.

HAN YÜ, hän yu, better known as **HAN WÊN KUNG,** hän wün kōōng (768-823). A Chinese poet, essayist, and philosopher. He was born at Têng-chow, in Ho-nan, in 768, became a diligent student of the classics, graduated with honors at twenty-four, and shortly thereafter entered the public service. In 819, while vice-president of the Criminal Board, he incurred the displeasure of the Emperor, a great patron of Buddhism, by addressing to him a strongly worded remonstrance against certain public honors with which an alleged relic of Buddha was being conveyed to the palace. Through the intervention of friends he escaped with his head, but was dismissed from the Court and banished to a semi-barbarous region in the present Province of Kwang-tung. There he served for eight months as Governor, civilizing the inhabitants and conferring upon them many benefits. Afterwards he was recalled to the capital, restored

to high office at Court, and loaded with honors, dying at fifty-five, in 823. He was canonized as *Wen Kung*, 'Prince of Letters,' was ennobled as Earl of Ch'ang-li, and in 1084 his tablet was placed in the Temple of Confucius. Many editions of his works have appeared, and his name is venerated as the foremost scholar in China.

HAPARANDA, hä'pȧ-rän'dȧ. The most northerly town of Sweden, situated near the mouth of the Torneå, near the northern shore of the Gulf of Bothnia (Map: Sweden, L 4). It is noted chiefly for its meteorological station, established in 1859, and known as one of the northernmost stations of the world. Population, in 1890, 1252.

HAPAXANTHIC, hä'päks-ān'thĭc, **HAPAXANTHOUS** (from Gk. ἅπαξ, *hapax*, once + ἄνθος, *anthos*, flower). A botanical term applied to plants that blossom and fruit only once in their life cycle. They are also characterized by the almost complete absence of vegetative reproduction. The term and its synonym, monocarpic, are in contrast to pleiocyclic. All annuals, most biennials, and a few perennials (such as the century plant) are hapaxanthic plants.

HAPHTARAH, häf-tä'rȧ (plural *haphtaroth*, Heb., sections, from *pātar*, to split). The fifty-four sections from the prophets used in the synagogues on Sabbaths and feast-days, in connection with the same number of sections into which the law is divided, called *parshioth*. This reading of the law and prophets is alluded to in the New Testament (Luke iv. 17; Acts xiii. 15).

HAPLO'MI (Neo-Lat. nom. pl., from Gk. ἁπλόος, *haploos*, single + ὦμος, *ōmos*, shoulder). An order of soft-rayed, pike-like fishes, characterized chiefly by the absence of the mesocoracoid bone. They are mostly inhabitants of fresh waters, and include the mud-minnows (Umbridæ), the pikes (Luciidæ), the great group of top-minnows, killifishes, and other 'cyprinodonts' (Pœciliidæ), and the blindfish (Amblyopsidæ).

HAPPY VALLEY, THE. A blissful abode, in Johnson's *Rasselas*, which is shut in by mountain barriers from the cares and sorrows of the outside world, and accessible only through a single passage. From it the Prince of Abyssinia starts on his journey through the world.

HAPSBURG, or **HABSBURG,** häps'bo̅o̅rk, HOUSE OF. The Imperial royal house of Austria-Hungary. It is commonly supposed to have derived its name from the Castle of Habsburg, or Habichtsburg (Hawk's Castle), on the bank of the Aar, in the Swiss Canton of Aargau. The castle is said to have been built about 1027 by Werner, Bishop of Strassburg. His nephew, Werner I., was the first Count of Hapsburg; but the real founder of the House of Hapsburg was Albrecht or Albert III. (c.1172), the son of Werner II., who, in addition to extensive estates which he had inherited in Upper Alsace, acquired several Swiss districts (in the neighborhood of Zurich, the Lake of Lucerne, etc.). To these his son, Rudolph I., added the Countship of Aargau. On Rudolph's death, in 1232, his sons, Albert IV., the Wise, and Rudolph II., divided their father's possessions—Rudolph becoming the founder of the Hapsburg-Lauffenburg line. This branch became extinct in 1415, its possessions, except the Klettgau, reverting to the Austrian line.

The son and successor of Albert IV., Rudolph III., was elected to the Imperial throne of Germany in 1273 (as Emperor, styled Rudolph I.), and founded the greatness of the House of Hapsburg. In 1276 he vanquished Ottokar II. of Bohemia and forced him to give up the duchies of Austria and Styria, with other territories. In 1282 he invested his sons Albert and Rudolph with the territories which he had thus acquired. Albert I. purchased his brother's share in 1283, and on the death of his father, in 1291, succeeded to that prince's possessions, which included large districts in Switzerland. (See AUSTRIA-HUNGARY.) He was raised to the Imperial throne of Germany in 1298, and was murdered in 1308 by his nephew, John the Parricide, while preparing to subdue the Swiss, who had risen in defense of their liberties. Of his six sons, Rudolph was King of Bohemia, 1306-07, and Frederick I. was one of the rival kings of Germany (as Frederick III.) from 1314 to 1322 (died 1330). For the succeeding hundred years the Imperial office was held by other families, and the Hapsburgs were occupied mainly in ruling their hereditary possessions. It was a family principle that the lands were indivisible, and that the brothers should rule jointly. This principle was neglected at times, but the deaths of holders of territories which had been separated from the main possessions brought all Hapsburg lands under a single rule in 1457, and again in 1490. During this early period there were relatively few children, and many of the princes died without leaving heirs. This is in striking contrast with the later Hapsburgs, who were remarkably prolific, families of thirteen to fifteen children being common.

From 1438 until the abdication of Francis II. in 1806, all but two of the Emperors of the Holy Roman Empire (Charles VII. and Francis I.) were Hapsburgs. The house attained its greatest power through the marriage alliances in the last quarter of the fifteenth century. In 1477 Maximilian, who became Emperor in 1493 (Maximilian I.), married Mary of Burgundy, daughter of Charles the Bold, and thus obtained all the Burgundian possessions, which included the Netherlands, at that time the most opulent country in Europe. His son, Philip, who died in 1506, married Joanna, heiress of Spain, daughter of Ferdinand and Isabella. Their eldest son, Charles I. (Charles V. of the Empire), received as his share of the family possession Naples, Sicily, and Sardinia, while the Austrian possessions (Austria, Styria, Carinthia, Carniola, Tyrol, Alsace, Breisgau, etc.) were left to him and his brother Ferdinand, jointly. His share in these last Charles relinquished to Ferdinand. In 1535 Charles added the Duchy of Milan to his possessions. Charles was the founder of the Spanish line of Hapsburgs. Ferdinand was elected in 1526 to the throne of Bohemia (the Bohemian kingdom at this time including Moravia, Silesia, and Lusatia), which soon became practically hereditary in the Hapsburg line. At the same time he was elected king in a part of Hungary, the crown of which country, after the expulsion of the Turks, was by violence made hereditary in the Austrian dynasty (1687). The union of so many different countries in the hands

THE HAPSBURG FAMILY

Rudolph I. (1218–91)
Holy Roman Emperor 1273–91

- **Albert I.** (died 1308) German King 1298–1308
- Rudolph II. (died 1290)
  - John Parricida (died 1313)
- Rudolph III. (1281–1307) King of Bohemia 1306–07
- **Frederick the Fair** (1286–1330) German King 1314–30
- Albert II. (1298–1358) Duke of Carinthia
  - Rudolph IV. (1339–65)
  - Frederick III. (1347–63)
  - Albert III. (1349–95)
    - Albert IV. (1377–1404)
      - **Albert (V.) II.** (1397–1439) Holy Roman Emperor 1438–39
        - Ladislaus Postumus (1440–57)
    - Ernest the Iron (1377–1424)
      - **Frederick (V.) III.** (1415–93) Holy Roman Emperor 1440–93
        - (1) Mary of Burgundy = **Maximilian I.** (1459–1519) = (2) Maria Bianca Sforza. Holy Roman Emperor 1493–1519
          - Joanna of Castile = Philip the Fair (1478–1506)
            - **Charles (I.) V.** (1500–58) Holy Roman Emperor 1519–56
              - PHILIP II. (1527–98) King of Spain 1556–98
                - Don Carlos (1545–68)
                - PHILIP III. (1575–1621) King of Spain 1598–1621
                - Anna Maria (1601–66) m. Louis XIII. of France
                - PHILIP IV. (1605–65) King of Spain 1621–65
                - Maria Anna (1606–46) m. Emperor Ferdinand III.
              - Margaret of Parma (1522–86) (illegitimate) Stadtholder of Netherlands 1559–67
              - Don John of Austria (1547–78) (illegitimate)
            - Margaret (1480–1530) Stadtholder of Netherlands 1507–30
          - **Ferdinand I.** (1503–64) Holy Roman Emperor 1556–64
            - **Maximilian II.** (1527–76) Holy Roman Emperor 1564–76
              - **Rudolph II.** (1552–1612) Holy Roman Emperor 1576–1612
              - **Matthias I.** (1557–1619) Holy Roman Emperor 1612–19
              - Albert VII. (1559–1621) Stadtholder of the Netherlands 1596–1621
              - Maria Theresa (1638–83) m. Louis XIV. of France
              - Margaret Theresa (1651–73) m. Emperor Leopold I.
              - CHARLES II. (1661–1700) King of Spain 1665–1700 (Spanish Hapsburg line extinct)
              - **Ferdinand III.** (1608–57) Holy Roman Emperor 1637–57
                - FERDINAND IV. (1633–54) King of Bohemia and Hungary
                - **Leopold I.** (1640–1705) Holy Roman Emperor 1658–1705
                - Maria Antonia (1669–92) = Maximilian Elector of Bavaria
                - Joseph Ferdinand (1692–99), Candidate for Spanish throne. (See under SUCCESSION WARS, section on War of the Spanish Succession)
                - **Joseph I.** (1678–1711) Holy Roman Emperor 1705–11
                - **Charles VI.** (1685–1740) Holy Roman Emperor 1711–40
                - MARIA THERESA (1717–80) = **Francis I. Stephen** (1708–65) Holy Roman Emperor 1745–65
                - **Joseph II.** (1741–90) Holy Roman Emperor 1765–90
                - **Leopold II.** (1747–92) Holy Roman Emperor 1790–92
                - **Francis II.** (1768–1835) Holy Roman Emperor 1792–1806 Emperor of Austria 1804–35
                - Marie Louise (1791–1847) m. Napoleon I. (1810)
                - **Ferdinand I.** (1793–1875) Emperor of Austria 1835–48
                - Francis Charles (1802–78)
                - **Francis Joseph I.** (1830—) Emperor of Austria 1848—
                - Maximilian (1833–67) Emperor of Mexico 1864–67
                - Karl Ludwig (1833–96)
                - Franz Ferdinand (1863—) Heir to the throne, but renounced right of succession for his children on marrying Countess Chotek in 1900
                - Otto (1865—)
                - Ferdinand (1868—)
                - Karl Franz Joseph (1887—)
                - Maximilian Eugen Ludwig (1895—)
                - Gisela (1856—) m. Prince Leopold of Bavaria
                - Rudolph (1858–89) = Stephanie, daughter of Leopold II. of Belgium
                - Elizabeth (1883—)
                - Marie Valerie (1868—) m. Francis Salvator of Tuscany
- Charles IV. = Eleanor of Lorraine 1653–97
  - Leopold of Lorraine (1679–1729)

of one family threatened the security of the other European countries, and especially of France, which was shut in by the possessions of Charles V. The rivalry which resulted continued until the end of the eighteenth century, and brought upon Europe many wars. (See EUROPE.) In the sixteenth and seventeenth centuries the struggles between France and the Hapsburgs were involved with the religious wars. In the second half of the sixteenth century the power of the Spanish branch of the Hapsburgs received a severe blow in the revolt of the Netherlands, the northern provinces of which finally achieved their independence. By the middle of the seventeenth century the Hapsburg power was declining steadily. The Spanish branch, which after Charles I. (Charles V.) had been represented by Philip II., III., and IV., and Charles II., became extinct in 1700. The Austrian Hapsburgs became extinct in the male line by the death of Charles VI. in 1740. By the Pragmatic Sanction (q.v.), however, his daughter, Maria Theresa, succeeded to the throne. She was married to Francis I. of the House of Lorraine, and their descendants have continued to rule in Austria until the present day. One of Maria Theresa's fifteen children was Marie Antoinette, the wife of Louis XVI. of France; a great-granddaughter, Maria Louisa, was the wife of Napoleon; another great-granddaughter was the wife of Pedro I. of Brazil; and a great-grandson was Maximilian I. of Mexico.

Consult: Lichnowsky, *Geschichte des Hauses von Habsburg* (8 vols., Vienna, 1836-44); Coxe, *House of Austria* (3 vols., London, 1807); Schultze, *Geschichte der Habsburger in den ersten drei Jahrhunderten* (Innsbruck, 1887); Weihrich, *Stammtafel zur Geschichte des Hauses Habsburg* (Prague, 1892); Hoernes, *Oesterreich-Ungarn und das Haus Habsburg* (Teschen, 1892). See genealogical table of the Hapsburg family.

HAP'TERA (Neo-Lat. nom pl., from Gk. *ἁπτειν, haptein,* to fasten). A botanical term denoting organs for attachment that contain no vascular bundles, and are, therefore, not roots. They occur on various marine algæ, on the tendrils of Ampelopsis, etc.

HARA-KIRI, hä'rä-kē'rē (Japanese, belly-cut), or, more elegantly, **SEPPÚKŬ,** sĕp-pōō'-ku (the Japanese pronunciation of *Ts'ich-fuh,* to cut belly). Self-disembowelment; a form of suicide permitted in feudal Japan among the territorial nobles and Samurai (q.v.), when unwilling to survive some disgrace. From being a custom, it had, about A.D. 1500, developed into a privilege, so that noblemen and gentlemen could demand that the form of judicial punishment be death at their own hands, instead of dying like common criminals. The ceremonies and etiquette of *seppúkŭ* became very elaborate, and this form of judicial suicide degenerated into execution at the hands of one's best friend. Arrayed in the neatest of clothing, in a measured space, behind white curtains, the victim and his friends and the official witnesses took their places. The dirk was laid upon a tray and presented by the second, while at the moment of incision, or while the principal was stretching out his hand to seize the dirk, the 'best man' or friend of the accused took off the latter's head with a sweep of his sword. Then, the official witnesses having inspected and identified the head, it was reverently washed by friends. With the decay of feudalism, the custom has fallen out of use, but is even yet occasionally practiced. *Harri-karri,* a form of the word hara-kiri, which is frequently found in newspapers and other more pretentious publications, is erroneous, as is the translation 'happy dispatch.' Consult: Mitford, *Tales of Old Japan* (London, 1876), and Chamberlain, *Things Japanese* (London, 1891).

HAR'ALD, or **HAR'OLD I.,** surnamed HAARFAGR, or FAIR-HAIRED (c.850-933). King of Norway from about 860 to about 930. He was a descendant of the ancient race of the Ynglings, and the son of Halfdan the Swarthy, the most powerful of the many jarls or petty kings who then ruled in Norway. According to the popular saga, Harald was induced to attempt the subjugation of the whole of Norway, by his love for a beautiful maiden, named Gyda, who declared that she would not be his wife until he was sole king of the country; and he swore that he would neither cut nor comb his hair till he had subdued all the land to his sway—an oath which he kept. After many years' contest with his brother jarls, and after defeating the last general confederacy of the independent Norwegian chieftains, in a naval battle at Hafrsfjord, he remained sole ruler of the land (872). Harald's severity compelled the deposed rulers to seek other homes; and his reign is memorable for the many new settlements which were made by these exiles in the Orkneys, the Hebrides, the Shetlands, the Faroe Islands, and Iceland, which, except Iceland, were also subdued by Harald. (See NORMANS.) Although a barbarian, Harald ruled with a sound policy in advance of his age, and by his firmness succeeded in suppressing for a time the private warfare and sea-piracy which had prevailed in Norway before his reign. The dissensions of his numerous sons, however, checked all the good that might have resulted from his measures. To restore concord in his family, he divided his dominions among his children, but vested the supreme power in his eldest son, Eric Blodoexe, or Bloodaxe (c.930). Harald died about 933. Consult Boyesen, *Norway* (New York, 1886).

HARALD, or **HAROLD III.,** surnamed HAARDRAADE, or HARD RULER (1015-66). King of Norway from 1046 to 1066. He was the son of Sigurd, chief of Ringerike, and a descendant of Harald I. In his boyhood he was present at the battle of Stiklestad in 1030, in which his brother, Olaf, King of Norway, surnamed the Saint, was slain. Harald subsequently went to the Court of Jaroslaff, Grand Prince of Novgorod and Kiev, and afterwards to Constantinople, where he became captain of the Varangian bodyguard of the Greek Emperors. In this office he experienced many marvelous adventures, which have supplied abundant materials for the narratives of the older sagas and the modern romances of the North. According to these, he took part in the expedition against the pirates of the Mediterranean, and visited Jerusalem, where he fought successfully against the Saracens, whom he also defeated in eighteen pitched battles in Sicily and Africa. On his return to Constantinople, he drew upon himself the vengeance of the Empress Zoë by an intrigue with her relative, Mary, after he had rejected Zoë's proffered

love. He escaped with difficulty from prison, where he had been thrown on a charge of treason, returned to Russia, 1044, married the daughter of Prince Jaroslaff, and took her with him to Norway (1046), where his nephew, Magnus, the son of Saint Olaf, agreed to divide the royal power with him, in return for a share of his treasures. The death of Magnus, in 1048, left him sole King of Norway. His unruly spirit would not, however, suffer him to rest; and he entered into a war to dethrone the King of Denmark. Although he was successful in battle against the Danes, he gained no real advantages by the contest; and in 1064 he concluded a peace in which he recognized the right of Sweyn, the nephew of Canute, to the throne of Denmark. In 1066 he landed in England to aid Tostig (q.v.) against his brother Harold, King of England, but was slain in battle at Stamford Bridge. Consult Boyesen, *Norway* (New York, 1886).

HA'RAN, or CHARRAN, kär'rān (Ass. *Kharranu*, road). A city in the north of Mesopotamia, and southeast of Edessa, at the junction of the Damascus road with the highway from Nineveh to Carchemish. For the Assyrians it became a strategic position of first-rate importance, and is mentioned in inscriptions as early as the time of Tiglathpileser I., about 1100 B.C. Sargon II. (B.C. 721-705) refers to his having restored the ancient privileges of the place, and later kings, like Assurbanipal, devoted themselves to the restoration of the temple to the moon-god, which enjoyed a high reputation as a place of pilgrimage. Haran, the Carrhæ of the Greeks and Romans, became, by virtue of its situation, the centre of considerable commerce. It was here that the Roman general Crassus, in his eastern expedition, was attacked and slain by the Parthians (B.C. 53), and here also the Emperor Caracalla was murdered at the instigation of Macrinus, A.D. 217. The place retained its importance down to the period of the Arab ascendancy, but is now wholly in ruins. According to the Book of Genesis, which traces the name to Haran, a son of Terah, Haran was the first resting-place of the latter and his family, after their migration from Ur of the Chaldees, and here Terah died before Abraham's migration into Canaan (Gen. xi. 31-32). The story recalls the tradition of the sojourn of some clans—probably of Aramean origin—associated with Hebrews at some remote period. Consult: Metz, *Geschichte der Stadt Harran* (1892); Sachau, *Reise in Mesopotamien* (Leipzig, 1899).

HARAR, hä-rär'. See HARRAR.

HARATIN, hä'rä-tēn'. 'Black' Berbers, living on the southern slopes of the Atlas Mountains. Their darker complexion is doubtless owing to mixture with negroes. They are interesting to the ethnologist in that they still preserve the patriarchal tribal state. See BERBER.

HARAUCOURT, ä'rō'kōōr', EDMOND (1857—), A French poet and novelist, born at Bourmont (Haute-Marne). His first work, *La légende des sexes, poèmes hystériques* (1883), under the pen-name of Le Sire de Chabley, attracted some attention. *L'âme nue* (1885), a collection of verse, in which some of the earlier poems were included, and *Seul* (1891), showed the poet's increasing power and melancholy charm. He also wrote the romance *Amis* (1887); *Shylock* (1889), a play; the *Passion* (1890), a drama; *Héro et Léandre* (1893); *Alienor*, an opera; *Don Juan* (1894); and *Elisabeth* (1894). He received the Academy prize for his poem, *Les Vikings* (1890).

HARBAUGH, här'bą, HENRY (1817-67). An American clergyman of the German Reformed Church, born near Waynesborough, Pa. He studied in Mercersburg Seminary, where he became professor of theology in 1864. He was the chief exponent of the 'Mercersburg theology.' From 1850 to 1866 he was the editor of the *Guardian*, a monthly magazine, and afterwards of the Mercersburg *Review*. He published some poems in 'Pennsylvania Dutch,' and also wrote: *Heaven* (3 vols., 1843-53); *The Fathers of the German Reformed Church* (1858); and *Christological Theology* (1864).

HAR'BIN, or KHAR'BIN. A city of Manchuria situated on the right bank of the Sungari River at the point where the Manchurian Railway to Vladivostok bifurcates, a branch extending to Port Arthur and Peking. It is about 600 miles northeast of Port Arthur, and 350 miles northwest of Vladivostok (Map: Chinese Empire G 2). It is a "fiat city" created by the Russian Government to serve as a railway administration centre and military depot. It consists of the old, or native, town, which was all that existed before the building of the railway, the harbor, or river, town, also called Prestin, and the administration town. The last two are almost exclusively Russian, and consist of new and substantial brick houses, among which a number of large and pretentious public buildings are in course of construction. There are already established a technical and a commercial school, a theatre, hospitals, and among financial institutions a branch of the Russo-Chinese Bank. By the end of 1903 considerable commerce and industry had sprung up. Besides the extensive railway shops there were eight flour mills in operation with modern machinery, several breweries, distilleries, meat packing establishments, and brick factories. Steamers leave daily for the Amur, and the railway traffic is extensive. The population has increased rapidly from 12,000 in 1900 to about 60,000 in 1903.

HARBOR (ME. *harbor, herbore, herberwe, herberge*, Icel. *herbergi*, OHG. *heriberge*, Ger. *Herberge*, from OHG. *heri*, Ger. *Heer*, AS. *here*, army + OHG., Ger. *bergen*, AS. *beorgan*, to shelter). An indentation or inlet on the shore of a sea or lake so protected from the winds and waves, whether by natural conformation of the land or by artificial works, as to form a secure roadstead for ships. In the broadest meaning harbor works include all the structures and appurtenances which facilitate the safe anchorage, loading, unloading, and repairs of vessels which seek harbors in the way of commerce and safety from storm; in this sense quays, docks, breakwaters, jetties, piers, and wharves, etc., are essential parts of harbors. In this article, however, the broad question of harbor construction as illustrated by typical harbors will alone be considered. For specific consideration of the parts of harbor works, see BREAKWATERS; DOCKS; JETTY; LIGHTHOUSES; QUAYS; etc.

EARLY HARBOR WORKS. With the birth of commerce and naval warfare, in the earliest ages of civilization, arose the necessity for artificial harbors. The Phœnicians set to work to protect their scanty strip of Levantine coast. At Tyre, two harbors were formed, to the north and to

the south of the peninsula on which the city was placed. At Sidon, similar but less extensive works long testified to the wealth and engineering genius of the Phœnicians. The breakwaters were principally constructed of loose rubble. Carthage, in another part of the Mediterranean, also possessed a harbor, though its site is not very satisfactorily determined. It was in two divisions, formed by moles; time, however, has dealt so hardly with it that few traces remain. In Greece nature provided so many navigable inlets that little remained to be done by man. Nevertheless, some minor works were executed at the Piræus and elsewhere, chiefly for warlike purposes. The Romans, finding ships necessary to the dominion of the world, set about constructing harbors for them. The coasts of Italy still show how well they understood both the principles and the practice of this branch of engineering. A distinguishing feature of their harbor-making is the open or arched mole. Built with open arches, resting upon stone piers, it gives full play to the tidal and littoral currents, thus preventing the deposit of sand or mud; but in proportion as this advantage is increased (by increasing the span of the arches), so also is the agitation, and consequent insecurity, of the water within.

The decay of commerce and civilization, consequent upon the fall of the Roman Empire, put a stop to harbor-making; nor did the art revive until the revival of commerce by the Italian republics of the Middle Ages. The rich traffic of Venice and Genoa soon led to the construction of suitable ports at those places; and the moles of the latter city, and the works in the lagoons of Venice, remain to this day. France was next in the field, embanking, protecting, and deepening the mouths of the rivers along her northwestern shores, as at Havre, Dieppe, Dunkirk, etc. In 1627, during the siege of La Rochelle, Metezeau constructed jetties of loose rubble-stone, to prevent access to the city. England lagged far behind her Continental rivals. With few exceptions, her ports were absolutely unprotected, or rather uncreated, until late in the last century. Two of the few exceptions were Hartlepool, where a harbor was formed about 1250, and Arbroath, in 1394. In the seventeenth century, at Whitby and Scarborough, also in Yorkshire, rough piers were thrown out, protecting the mouth of the port; while at Yarmouth, in Elizabeth's reign, a north jetty, and subsequently a south one, were formed. An ancient mole existed at Lyme Regis. But the chief efforts of the early English engineers were directed against the shoals and waves of Dover. With the advent of Smeaton, however, things took a different turn; and now few countries surpass Great Britain in the number of artificially improved commercial harbors, or in the just appreciation of their importance.

The development of harbor works in America, of course, belongs entirely to modern times. The first regular appropriation for harbor work in the United States was made in 1802; it amounted to $30,000, and was to be devoted to the erection of public piers at Philadelphia, Pa. In 1822 an appropriation of $22,700 was made for the construction of a harbor of refuge in Delaware Bay. The first approach to a river and harbor bill was made in 1826, when about $150,000 was appropriated for carrying on work in about twenty localities. From 1826 to 1838 aggregate appropriations carried by the various river and harbor bills were about $9,000,000. From 1838 to 1866 the aggregate expenditure was $6,600,000. The total aggregate expenditure of the United States on river and harbor works from 1820 to 1894 was $262,845,900. Since 1894 the annual amount set aside by Congress for such works has rapidly increased, until in 1900-01 the River and Harbor Bill called for an appropriation of nearly $60,000,000 for new work, and the Sundry Civil Service Bill called for an appropriation of $7,000,000 for continuing work in progress.

Harbor Construction. The designing and construction of harbors constitute one of the most difficult departments of civil engineering. In discussing this branch of the subject attention will be limited to commercial harbors, including harbors of refuge. The general plan of commercial harbors differs in different nations, and there is a great diversity of form due to the methods of commercial means of disposing of the freight received from vessels. It may be set down, as a general rule, that the ship itself does not determine the character of the harbor beyond the fact that it must be of sufficient depth to accommodate ships of the maximum draught using the harbor. In some of the most important ports of the world there are practically no installations for handling freight, the ships anchoring in the open harbor and discharging their cargoes into lighters. Railways play a far more important rôle in determining the arrangement of the harbor, particularly in regard to the dock and quay arrangement. In the last respect, also, the local movement of commerce of the city itself plays an important part.

Turning now to the natural conditions which influence the character and arrangements of harbors, it may be stated that the topographic and geologic conditions exercise a decisive influence. A harbor may be situated directly upon the seacoast or in some river, bay, or gulf, or far in the interior on some river or maritime canal. The effects of the ocean, the action of the winds and tides, and the general conformation of the shore-lines are other controlling factors in determining the arrangement of harbor works. Finally, the nature of the soil, whether alluvial, or diluvial, or rocky, plays an important part in the arrangement of the basins, either natural or artificial, and the adoption of quays, jetties, piers, etc.

The great variety of commercial and natural conditions which influence the arrangement of harbor works of course call for a corresponding variety of arrangements; it is obviously impossible to describe each here. For the sake of clearness we may somewhat arbitrarily divide harbors into, first, those located on a comparatively open coast; second, those located at river mouths or on bays or gulfs, and thus more or less landlocked; and third, those located well inland on rivers or maritime canals.

The simplest form of open-coast harbor consists of a quay wall or bulkhead wall open to the sea, and serving only to enable ships to tie up alongside the shore and discharge and receive cargoes. Such a quay affords comparatively no protection from the winds, tides, and currents. The next advance is a straight pier extending out from the shore. This pier affords little shelter to ships from waves coming directly inshore, but in case of winds and waves along shore it affords

protection on its lee side. Another step in advance is to build the pier bent or curved with its concave side toward the shore. A still further improvement is to build two curved piers converging toward each other so as to include a harbor basin with an opening between the sea ends of the piers. Still another method is to build off shore an insular breakwater, which prevents the waves from breaking on the shore, and thus forms a comparatively tranquil basin between the breakwater and the shore. Harbors of all these forms are found in practice. More generally, however, two or more of the structures mentioned are combined to form harbor basins of various forms and dimensions. Figures 1 and 2 show in outline form two representative open-coast harbors.

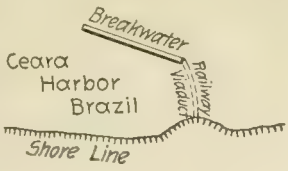


Fig. 1.

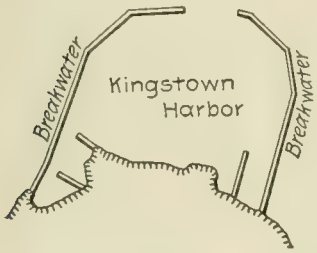


Fig. 2.

When the conformation of the coast-line is of the nature of an indentation in the land, as in the case of a bay, gulf, or river-mouth, then a portion of it may be utilized, to take the place of one or more of the structures necessary to form an open-coast harbor. For example, the harbor of New York is so inclosed by land that no artificial structures in the shape of piers or breakwaters are needed to secure a tranquil harbor basin. Where the bay or inlet is less perfectly landlocked, piers, breakwaters, or jetties are constructed to supply the necessary protection at the exposed points. Figs. 3 to 6 show actual arrangements of such structures in different circumstances.

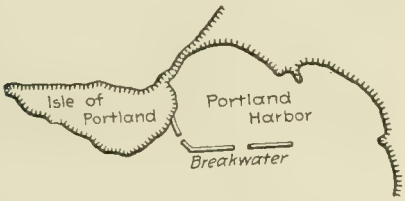


Fig. 3.

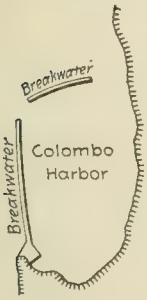


Fig. 4.

The artificial works involved in inland harbors consist of jetties at the mouth of the river or canal, bank protection, and other constructions for preserving the channel, and the building of docks and quays in the harbor proper. Among the notable inland harbors of the world are those of Hamburg, Manchester, and Amsterdam, in Europe; and Charleston and Philadelphia, in America. Fig. 7 shows the entrance harbor of the ship canal leading to the harbor of Amsterdam, and Fig. 8 that at the entrance of the Suez Canal, at Port Saïd.

In what has preceded, we have concerned ourselves only with the general arrangement of harbor structures under different topographic conditions. For specific information concerning jetties, breakwaters, docks, piers, quays, etc., the reader should consult the articles with these titles. Whatever the construction and arrangement of these constituent structures of a harbor may be, they are such that the harbor consists of an entrance, of an anchorage space, and of docks. By the entrance is meant the navigable pass by which vessels enter the harbor. Some ports have natural entrance channels of large dimensions and great depth, and in other harbors this channel is of small size and has to be artificially constructed and maintained. Generally speaking, the minimum width of practical entrance for ships of modern dimensions is from 230 feet to 490 feet, but for large commercial ports it should be preferably from 650 feet to 1000 feet wide. Sometimes the entrance channels constitute the anchorage space tributary to the entrance channel and the docks. No general rule can be laid down for the area of anchorage space, for this is governed by the local conditions at each port. When the natural harbor bank does not give sufficient room for the commerce of a harbor, various methods are adopted for increasing this shore space. The most simple is to build out from the shore a series of piers or wharves with water spaces between them to form docks. When this is not practicable quays are built which inclose dock basins. The nature of these two classes of structure is described in the article on DOCKS.

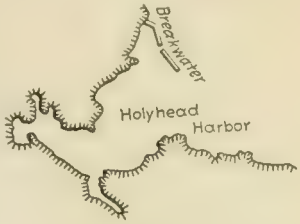


Fig. 5.

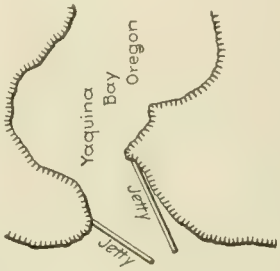


Fig. 6.

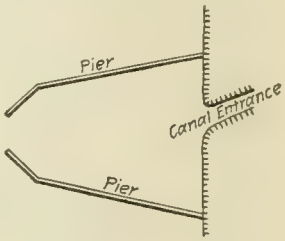


Fig. 7.

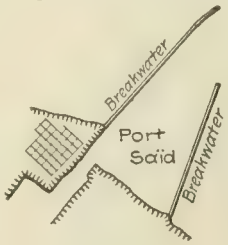


Fig. 8.

For a comprehensive treatise on harbors, consult: De Cordemoy, *Les ports modernes* (Paris, 1900); Vernon-Harcourt, *Harbors and Docks* (London, 1885). The best

descriptions of important recent harbor works will be found scattered through the proceedings of the various engineering societies and the engineering papers.

HARBOR. As judicially defined, a place to shelter ships from the violence of the sea, and where ships are brought for commercial purposes to load and unload goods and passengers. It includes quays or docks and other instrumentalities for the use and protection of ships. The term is generally considered a legal synonym for 'haven' and 'port,' although at times it is employed in a somewhat narrower sense than either of these terms. It is not necessary, to constitute a harbor, that it be landlocked or absolutely safe for ships. It is enough that it affords a reasonably safe place of retreat from winds and storms.

In Great Britain the right to construct or control harbors is vested in the Crown, but at present they are generally owned or managed by boards or commissions under special acts of Parliament. Even when an individual is the owner of a harbor, under a grant from the Crown or by proscription, he holds it subject to the right of the public to make use of it and of the State to control it. The Government has the power, also, of closing particular harbors or ports, either absolutely, or to certain lines of imports or exports. It has the power, too, of regulating all harbor fees and the conduct of business transacted in harbors. At present, the various boards or commissions are authorized by Parliament to make all needful regulations and, within certain limits, to fix the charges on goods and ships. It is their duty, on the other hand, to keep the harbors in a reasonably safe condition for those entitled to use them. If they do not, they are liable for any injury which results from their negligence. This rule does not obtain in harbors controlled directly by the Government, and known as the King's harbors. Here the maxim applies that "the King can do no wrong;" that is, the State cannot be sued without its consent for injuries due to its negligence.

In the United States the development and control of harbors are shared to some extent by the Federal and the State governments. Large appropriations are frequently made by Congress for the improvement and defense of harbors, and the Federal Government, under its power to regulate foreign and interstate commerce, exercises a large degree of control over most ports. On the other hand, the ownership of docks, wharves, warehouses, and other harbor facilities afforded to commerce, is generally a matter of State legislation. Each State, too, has its pilot laws, its quarantine rules, and its harbor regulations, with which the Federal Government does not interfere, but which are subject to Federal laws so far as the subject—as quarantine, for example—is within the Federal jurisdiction.

A *harbor master* is a State official with extensive authority. He has power to regulate the times of landing, unloading, and loading vessels; to make room for such as need to be immediately accommodated by temporarily removing others; to collect harbor fees; to enforce obedience to his lawful orders, and, in certain cases, to settle disputes between the masters of vessels. In some States a board of harbor commissioners is provided for with large powers of control. Consult: Moore, *History of the Foreshore and the Law Relating Thereto* (London, 1888); *United States Revised Statutes*, Secs. 5244-5255; Birdseye, *General Laws of New York—Navigation Law and New York Harbor* (New York, 1901).

HARBOR GRACE. A port of entry on the west side of Conception Bay, Newfoundland, 27 miles west by north of Saint John's; the second town of importance in the island (Map: Newfoundland, G 5). The harbor is large, but exposed; it has a patent slip 260 feet long, and the wharves are protected by the beach. The trade of Harbor Grace is nearly one-fourth of that of the entire island. Population, in 1891, 6467; in 1901, 5184.

HARBORING. In law, the act of receiving and retaining a person in violation of the rights of another or of the public. Harboring the wife of another after notice from the husband not to do so is an actionable wrong against him, unless such act is a proper one for her protection. So the harboring of an apprentice or servant, with knowledge of the latter's obligation to his master, is an actionable tort at common law. One who knowingly harbors a felon becomes at common law an accessory to the crime, while the intentional harborer of one who has committed a misdemeanor is himself guilty of a misdemeanor. An innkeeper who is accustomed to harbor thieves is indictable at common law for maintaining a public nuisance. Some modern statutes make it criminal for any one to harbor thieves; that is, to shelter them or permit them to congregate on his premises. Other statutes impose a penalty for harboring seamen, knowing them to belong to any vessel. Under such statutes, and generally, the offense of harboring does not necessarily involve the element of secrecy or concealment. It is committed by merely sheltering or entertaining the prohibited person or permitting him to take refuge under one's roof. See ACCESSORY; HUSBAND AND WIFE; MASTER AND SERVANT; PARENT AND CHILD; and authorities there cited.

HAR'BORNE, WILLIAM (c.1545-1617). An English traveler and diplomat, the first English Ambassador to Turkey, born at Yarmouth. In 1575 he was elected to Parliament, but was not allowed to take his seat, and in 1577 he went to Turkey. Five years afterwards he was appointed Ambassador to that country. The Turkey Company, formed in 1579, received, thanks to his efforts, larger privileges than those granted to any other nation. He left Constantinople in 1588, and died at Mundham. An account of his journey from Constantinople in 1588 was printed in Hakluyt's *Collection of Voyages*, as well as the description of his outward voyage.

HARBOR-SEAL. The common seal (*Phoca vitulina*) of all northern seas, which formerly frequented numerously all the bays and harbors of the Atlantic coast as far south as Virginia, but now is uncommon south of Nova Scotia. Stragglers, nevertheless, are still seen at long intervals in the Hudson, and even in the Delaware rivers, where they once regularly ascended as far as tidewater went. It is still numerous in the Saint Lawrence, and has been taken in Lake Champlain. The leopard seal of the Pacific Coast (south to Southern California) is the same, and has been known to ascend the Columbia 200 miles. This seal attains a total length of about

5½ feet, and a weight of from 80 to 100 pounds. Brownish yellow with dark spots is the commonest color, but many variations occur, such as almost uniform dark brown, nearly black, and dark spotting on a light ground, or the reverse. It is distinct in habits from other seals, with which, in the North, it never associates on the ice-floes, but remains by itself on or near the shore, where it ascends the Arctic rivers almost to their sources in pursuit of the salmon. Hence it is known to seamen as the 'fresh-water' seal. The white skins of the young seals are regarded by the northeastern Eskimo as the best and prettiest material from which to make undergarments and the jackets of women and children. This is the common seal of Northern Europe and the British Islands. It is often captured young and petted and trained, when it shows great docility and affection, and its tricks are frequently exhibited in public shows.

HARBOR SPRINGS. A village and the county-seat of Emmet County, Mich., five miles northwest of Petoskey, on Lake Michigan and on the Grand Rapids and Indiana Railroad (Map: Michigan, H 3). It is a favorite summer resort, annually visited by some 5000 persons. It has an excellent landlocked harbor. The principal manufactures are lumber in various products, and flour. Population, in 1890, 1052; in 1900, 1643.

HARBURG, här'boorK. The capital of a circle in the Prussian Province of Hanover, situated on an arm of the Elbe, over which are built a railroad and a street bridge on the road to Hamburg, 7 miles to the north (Map: Prussia, C 2). The most noteworthy building of the town is the old castle on the Elbe. Harburg has a 'real' gymnasium and several industrial and commercial schools. It is a place of some industrial activity, producing jute, linseed and cocoanut oil, gutta-percha wares, chemicals, leather, cement, glass, machinery, boilers, and small steamers. It is connected by rail with Hamburg, Cuxhaven, and Bremen, and with Hamburg also by an electric street railway, and has a growing trade in groceries, wine, oil, coal, timber, etc. Harburg obtained municipal rights in 1297; belonged to Lüneburg and Hanover; and passed to Prussia in 1866. Population, in 1890, 35,081; in 1900, 49,153.

HAR'COURT, Simon, first Earl Harcourt (1714-77). An English diplomat and statesman. He was the only son of the Hon. Simon Harcourt, who died in 1720. On the death of his grandfather, Simon, first Viscount Harcourt, in 1727, he succeeded to the family titles and estates. After an excellent education and four years of foreign travel, he was appointed lord of the bedchamber to George II. In 1745 he raised a regiment for defense of the kingdom against the rebels, and in 1749 was advanced to the dignity of an earl. Harcourt was appointed governor to the Prince of Wales, afterwards George III., but resigned owing to his dislike of the absolutist principles in which the young Prince was instructed. Promoted to be lieutenant-general in 1759, he was appointed in 1761 special ambassador to demand the hand of the Princess Charlotte in marriage for the young King, who had succeeded to the throne in 1760. He was made Ambassador to Paris in 1768, and Lord Lieutenant of Ireland in 1772. By a proposal to tax the rents of absentee landlords he gained much popularity in that country, but the proposal was rejected by the Irish Parliament, which was swayed by English opinion. There was much official corruption during his term as Lord Lieutenant. He resigned in 1777.

HARCOURT, William, third Earl of (1743-1830). An English field-marshal. His military career began at the age of sixteen, when he took command of a troop raised at his father's expense and known as 'Harcourt's Black Horse.' He was aide-de-camp to Lord Albemarle at the siege of Havana (1762), but returned home to represent Oxford in Parliament (1768-74). He was a lieutenant-colonel of dragoons in the American Revolutionary War, and distinguished himself in the capture of Gen. Charles Lee, near the Delaware. During the war in Flanders he was raised to the command of the Duke of York's cavalry (1795), was made a general the following year, as well as head of the Royal Military College, Great Marlow, a position he held from its opening until 1805, and he was created field-marshal on the occasion of the coronation of George IV.

HARCOURT, Sir William George Granville Venables Vernon (1827-1904). An English statesman. He completed his education in Trinity College, Cambridge. Beginning the practice of law in 1854, he was in 1866 appointed Queen's Counsel. From 1868 to 1880 he represented Oxford in the House of Commons; from 1880 to 1895, Derby; and from 1895 until his death, Monmouthshire West had him as a representative. His principles were thoroughly liberal. His election to the professorship of international law in the University of Cambridge in 1869 is evidence of scholarship in his special field of study; so, too, was his appointment to the royal commission for amending the neutrality laws and to the royal commission for amending the naturalization laws. He was Secretary of State for the Home Department, 1880-85, and Chancellor of the Exchequer, 1886 and 1892-95. From 1894 to 1898 he led the Liberal opposition; and after the latter date he took an active stand against the policy of the Government with reference to the sinking fund, to the negotiations with the Transvaal, and to the raising of funds for the support of the South African War. As Home Secretary he introduced in 1884 an important bill for the reform of the municipal government of London. The budget which he, as Chancellor of the Exchequer, presented in 1894 made the income tax considerably more graduated, and reformed the 'death rates.' This budget is often mentioned as his greatest work. Amid his political labors he contributed to the *Saturday Review;* and various political pamphlets and letters originally printed in the *Times*, and signed 'Historicus,' were afterwards republished in a volume with considerable additions.

HARDANGER (här'däng-ēr) **FJORD.** An inlet of the Province of South Bergenhus, Norway, on the southwest coast. It is about 68 miles long and extends northeastward and south, encircling the Folgefond. With a regular steamboat service, it is a notable visiting place for summer tourists, owing to its wild and picturesque scenery, embracing mountain peaks, lofty cliffs, waterfalls, and on the east the Hardanger Fjeld, an elevated

ice-clad plateau. The narrow strips of well-cultivated land along the shores are densely populated by the Haranger, a people distinguished for their interesting national customs and dress.

HARD CASH. See VERY HARD CASH.

HARD'CASTLE. A family, the members of which are principal characters in Goldsmith's *She Stoops to Conquer*. The scene is laid about the country house of jovial Squire Hardcastle, the father of Kate, the heroine of the comedy, who assumes the airs of a barmaid in order to win the love of the bashful Marlow. The pretentious Mrs. Hardcastle is the mother of Tony Lumpkin, the Squire's stepson.

HARD CLAM, or **ROUND CLAM.** The quahog. See CLAM.

HAR'DECANUTE', HARDACNUT, or **HARTHACNUT** (c.1019-42). King of England and of Denmark. He was the son of Canute the Great and Emma of Normandy, and at the time of his father's death (1035) was ruling as under-king in Denmark. Canute had intended the crown of England for Hardecanute, but the English Witan decided that his half-brother Harold should be King of the North, and Hardecanute should have only Wessex. As Hardecanute neglected to take possession of his kingdom, it passed to Harold in 1037. On the latter's death, however, in 1040, Hardecanute was chosen King of England by the Witan. He arrived in England with a fleet of sixty ships, for the maintenance of which he extorted a heavy *danegeld*. He was coarse and violent in his habits, and unscrupulous in the means he adopted for the establishment of his power. His reign was peaceful. He died June 8, 1042, at the marriage banquet of one of his nobles, and with him ended the Danish line in England. He was succeeded by his half-brother, Edward the Confessor (q.v.). Consult Freeman, *The Norman Conquest*, vol. i. (Oxford, 1869).

HAR'DEE, WILLIAM JOSEPH (1815-73). An American soldier, prominent on the Confederate side in the Civil War. He was born in Savannah, Ga.; graduated at West Point in 1838; and served with distinction through the Seminole and Mexican wars. At the outbreak of the Civil War he resigned from the United States Army to accept a commission as colonel in the Confederate service, and during the first year of the war held various commands in the West. The next spring he commanded a corps in the Army of the Mississippi, and at Shiloh, April 6, 1862, led the first Confederate line of battle. During Bragg's invasion of Kentucky in the following September, he commanded the left wing of the invaders, and later took a prominent part in the battles of Perryville and of Murfreesboro. By this time he had attained the rank of lieutenant-general. In the summer of 1863 he was placed in charge of the defense of Mississippi and Alabama, but rejoined the army in time to command his corps at the battle of Missionary Ridge. Soon after this, December 2, 1863, he succeeded General Bragg in command of the Army of Tennessee, but was himself replaced by Polk on December 23d, who, however, gave way to Joseph E. Johnston on December 27th. Under General Johnston, Hardee fought through the Atlanta campaign, and after the fall of Atlanta was assigned to the command of the Department of South Carolina, Georgia, and Florida. His forces, largely composed of the local militia, were unable to make any effectual opposition to Sherman's march to the sea; and it was only by good generalship that Hardee was able to escape from Savannah before the Federal forces had completed its investment. He thereupon retreated northward through the Carolinas, and effected a junction with Johnston, under whose command he continued to serve until that general surrendered on April 26, 1865. After the war, he became a planter at Selma, Ala.

HARDELOT, är'd'-lō', GUY D'. A French song composer, born near Boulogne-sur-Mer, of patrician ancestry. After her marriage she was a resident of London, England, where she became known by her husband's name (Rhodes), although her compositions were always published under the signature of D'Hardelot. Her first published composition attracted attention to her work, after which Melba, Pol Plançon, and Calvé popularized her songs throughout the world, and particularly in the United States and England. Her songs, nearly all written to French words, although accompanied by an English translation, were marked by considerable melodic originality, and a general appropriateness of text and music; and as a rule make up in artistic daintiness what they lack in depth. Some of her better-known songs are: *A vous! Avec toi, Little Boy Blue, Mignon, Say yes, Truelove Land, Tristesse, Quand on aime,* and *A Bunch of Violets.* She made one visit to the United States, in company with Mme. Calvé.

HAR'DEN, MAXIMILIAN (1861—). A German journalist and author, born in Berlin. After a secondary education he became a contributor of essays and critiques on subjects of literature and the drama to the *Frankfurter Zeitung*, the *Gegenwart*, and the *Nation*. He first attracted attention by a series of articles on social and political topics, published originally in the *Gegenwart*, with the signature 'Apostata,' and subsequently in two volumes, with the title *Apostata* (1892). In 1892 he established the *Zukunft*, a weekly periodical which proved a very successful venture, and in 1896 published *Theater und Litteratur*. His individual and witty style and his unreserved expressions of opinion made him *persona non grata* to the Government, which he particularly opposed in connection with the policy of Von Caprivi. In 1900 he was condemned to six months' imprisonment in a fortress on the charge of *lèse-majesté*.

HARDENBERG, här'den-bĕrk, ALBERT (1510-74). A Dutch theologian, whose real name was Rizäus, but who is usually called Albert Hardenberg, from his birthplace in Holland. In 1517 he entered a monastic school, and about 1530 went to Louvain, where he soon developed a distaste for scholastic theology. At Mainz, where he went to study, he met Johannes a Lasco (q.v.), and was turned to Protestant ideas. He returned to Louvain, and preached the Reformation in a very mild form, but was forced to leave the city. He taught at Aduard for three years (1540-43), and then, through the efforts of A Lasco and of Melanchthon, left the Roman Church and went to Wittenberg (1543). Afterwards he came under the protection of the Archbishop of Cologne, who was friendly to the Reformation, and was settled as pastor at Kem-

pen. He is best known in Church history for his opposition to Luther's doctrine of ubiquity, and for his attempt to introduce Calvinistic tenets on the nature of the elements in the sacrament. In 1561 he went to Bremen, then to Sengwarden, and in 1567 to Emden, where he died. Consult Spiegel, *Dr. Albert Rizaus Hardenberg* (Bremen, 1869).

HARDENBERG, FRIEDRICH VON. A German lyric poet. See NOVALIS.

HARDENBERG, KARL AUGUST, Prince (1750-1822). A Prussian statesman, born at Essenrode, in Hanover, May 31, 1750. He was educated at Leipzig and Göttingen, and in 1776-78 traveled in France, Holland, and England. On his return to Hanover he became Councilor of the Privy Chamber, and was raised to the rank of count; but a private quarrel with a member of the royal family induced him, in 1782, to quit the Hanoverian service. He took up his residence at the Court of Brunswick, where the Duke appointed him, in 1787, president of the Council of State. Soon afterwards he was sent on a diplomatic mission to Frederick William II. of Prussia, who received him with marked distinction. In 1790 the Margrave of Ansbach and Bayreuth requested the Prussian monarch to furnish him with a person competent to administer the affairs of his dominions, and Frederick William recommended Hardenberg. When Ansbach and Bayreuth were united with Prussia in 1791, Hardenberg was appointed Minister of State and a member of the Cabinet. At the commencement of the war with France, the King summoned him to his headquarters at Frankfort-on-the-Main as administrator of the army. Early in 1795 he was sent to Basel, where on April 5th he concluded a peace between Prussia and the French Republic. After the accession of Frederick William III., Hardenberg was recalled to Berlin (1798), and was intrusted with the partial management of foreign affairs. In 1804 he became first Prussian Minister on the resignation of Haugwitz, and in this capacity endeavored to keep Prussia neutral in the war between France and England. Nevertheless, by the victory of Napoleon at Austerlitz, Prussia was compelled to enter into an alliance with Napoleon in the winter of 1805-06. Hardenberg was deprived of his office in April, 1806, and Haugwitz, who was friendly to the French, returned to power. Prussia was driven in the same year to take up arms against Napoleon. After the fatal battle of Jena, Hardenberg accepted the portfolio of Foreign Affairs, which he held for a few months only, Napoleon, who considered him the chief opponent of France in Prussia, demanding his dismissal at the Peace of Tilsit. In 1810 he was appointed Prussian Chancellor. Hardenberg now proceeded to carry out Stein's plan for a regenerated Prussia through the enactment of radical and far-reaching reforms. The victories of the British troops in the Spanish Peninsula, and the disasters that overwhelmed Napoleon's vast army in Russia, made it possible for Hardenberg to realize his patriotic efforts, and he had the satisfaction of seeing his plans crowned with success. The War of Liberation freed Prussia. Hardenberg subscribed to the Peace of Paris, May 30, 1814, and was soon after raised to the rank of prince by his sovereign. He accompanied the allied sovereigns to London and took part in the proceedings of the Congress at Vienna and in the conferences at Paris (1815). In 1817 he reorganized the Council of State, of which he was appointed president. He was present at the meetings of the monarchs of the Holy Alliance at Karlsbad, Laibach, Troppau, and Verona. His later policy showed reactionary tendencies, however, and lost him much of his previous popularity. During a tour through the north of Italy, he was taken suddenly ill at Pavia and died at Genoa, November 26, 1822. The services rendered by Hardenberg to his country were great; to him, next to Stein, Prussia is indebted for the improvements in her army system, the abolition of serfdom and feudal burdens, the throwing open of the civil service to all classes, and the complete reform of the educational system. Hardenberg's *Memoirs, 1801-07,* were suppressed until fifty years had elapsed, and were then edited with a biography by Ranke, *Denkwürdigkeiten des Fürsten von Hardenberg* (5 vols., Leipzig, 1877). Consult also: Klose, *Leben Karl Augusts, Fürsten von Hardenberg* (Halle, 1807); Meier, *Die Reform der Verwaltungsorganisation unter Stein und Hardenberg* (Leipzig, 1881); Seeley, *Life and Times of Stein* (London, 1879).

HAR'DEN-HICK'EY, JAMES ALOYSIUS (1854-98). An American adventurer and journalist, called a baron. He was born in San Francisco, but at the age of twenty-three settled in Paris, where he started a paper called the *Triboulet*, so conspicuous for its strong satirical attacks upon the Government that it was suppressed in about two years (1880). The editor had also been drawn into duels with other journalists, but his literary activity continued unabated, and under the nom-de-plume 'Saint-Patrice' he published *Un amour dans le monde* (1877); *Mémoires d'un gommeux* (1877); *Près du gouffre* (1877); *Sampiero* (1878); *Lettres d'un Yankee* (1879); *Aventures merveilleuses de Nabuchodonosor Nosebreaker* (1880); *Les facéties de Trogneville* (1883); *Nos écrivains* (1888); *La théosophie* (1890); *Plagiats bibliques* (1891).

HARDERWIJK, här'dēr-vīk. A small seaport and fishing town of the Netherlands, situated on the southeastern shore of the Zuyder Zee, 28 miles east of Amsterdam (Map: Netherlands, D 2). It is a fortified town and a recruiting station for the Dutch East India troops. The chief exports are grain, lumber, and fish. Population, in 1900, 7300. Harderwijk was a Hanse town and from 1648 to 1811 was the seat of a university.

HARDHACK. See SPIRÆA.

HARDHEAD. A fish. (1) See HALFBEAK. (2) See STEELHEAD. (3) A sailors' name for the California gray whale (q.v.), said to be due to its propensity for striking and upsetting the whalers' boats with its head.

HARDICANUTE. See HARDECANUTE.

HAR'DIE, JAMES ALLEN (1823-76). An American soldier, born in New York City. He graduated at West Point in 1843, and during the Mexican War was the military commandant of San Francisco. During the Peninsular, Maryland, and Rappahannock campaigns of the Civil War he was acting adjutant-general of the Army of the Potomac, and on November 29, 1862, was commissioned brigadier-general of volunteers. In

1863 he was appointed assistant adjutant-general with the rank of major on the staff of the regular army, and on May 24, 1864, was made inspector-general with the rank of colonel. After the close of the war he was a member of the board which decided upon the disposition of the arms and munitions in the Government arsenals, and he audited the war claims of Massachusetts and Kansas. On March 13, 1865, he was brevetted a major-general in the Regular Army.

HARDING, Chester (1792-1866). An American portrait painter. He was born in Conway, Mass., September 11, 1792. In 1812 he enlisted in the army as a drummer boy. Owing to failure in business, he went to Pittsburg, where he was engaged as a house-painter. At this time he became interested in portrait painting, and went to Paris, Ky. After a short time spent in study at Philadelphia he spent successful seasons at Saint Louis and Washington. In 1823 he established a studio in Boston, where he enjoyed great popularity. In 1832 he went to Europe. In London he met David Leslie and Sir Thomas Lawrence, and during a stay of three years painted the portraits of several prominent Englishmen, including the Dukes of Essex, Norfolk, and Hamilton, Samuel Rogers, and Lord Aberdeen. The chief characteristic of his portraits is their indication and appreciation of character. Harding had many friends, one of whom was Daniel Webster, whose portrait by Harding hangs in the Bar Association, New York. He died in Boston, April 1, 1866. Among his principal portraits are those of Washington Allston, John Randolph (Corcoran Gallery, Washington), General Sherman, Henry Clay, John C. Calhoun, Chief Justice Marshall, Charles Carroll, and Presidents Madison, Monroe, and John Quincy Adams.

HARDING, James Duffield (1798-1863). An English landscape painter and teacher, born in Deptford. He first studied painting and engraving, and then took up water-colors and became a member of the Water-Color Society (1821). He was one of the first after Turner to use body-color in this medium, and obtained excellent results with it. His paintings treat European scenes in a rather studied manner. He was the inventor of 'Harding's papers' (paper in different tints and textures for sketching), which were used until recently. He gave much attention to lithography, and obtained two gold medals from the Academie des Beaux-Arts for his plates. Among his works in it are *Home and Abroad* (1836, fifty plates), *Park and Forest* (1841), and *Picturesque Selections* (1861). Harding was a successful teacher, and published a number of text-books of no great importance.

HARDING, Karl Ludwig (1765-1834). A German astronomer, born at Lauenburg. He was educated at Göttingen, where he studied theology, and became a tutor in the family of Schröter in Lilienthal. Schröter was an enthusiastic astronomer, and Harding was soon appointed observer and inspector in his observatory. Here he discovered the third planetoid, Juno (1804). In 1805 he went to Göttingen as professor of astronomy, and eight years afterwards discovered, independently of Pons, the second comet of 1813. His published works include: *Atlas Novus Cœlestis* (1808-23; reëdited by Jahn, 1856), for long the most complete astronomical chart; *Kleine astronomische Ephemeriden* (edited with Wiessen, 1830-35); and the fifteenth in the series of Sternkarten of the Berlin Academy's publications (1830).

HARDING, Stephen (?-1134). The third abbot of the celebrated monastery of Cîteaux. Of his parentage and youthful history little is known beyond the fact that he was born at Sherborne, near Dorchester, England, of a respectable family, and in early life traveled first to Scotland, then to Paris, and later to Rome. On his way back he stopped at the Benedictine monastery at Molesme, near Dijon, Burgundy, and joining the Order, received the name of Stephen. He delighted in austerities, and left the monastery with some twenty companions, including the abbot and prior, in order that they might start a new monastery where the Benedictine rule should be strictly observed. Cîteaux, the 'cisterns,' fifteen miles south of Dijon, a barren and marshy spot, seemed attractive to the band, and there the monastery was built. In 1110 Stephen was elected its abbot. The rigor of observance which he enforced had such an effect in deterring novices from entering the new Order that at first grave fears were entertained for its stability; but Stephen persevered, and was rewarded in 1113 by the accession of Saint Bernard (q.v.) and thirty others, who gave such an impulse to the institute that in a short time the number of claimants for admission compelled him to found several new convents, and especially that of Clairvaux (1115), which, under the rule of Saint Bernard, attained to the very highest distinction in that age. Stephen continued till his death, at Cîteaux, March 28, 1134, to direct the fortunes of the Cistercian Order. In 1119 he drew up, in conjunction with Saint Bernard and other members of the brotherhood, the well-known constitutions of the Order, entitled the *Charter of Charity*, which were approved by Popes Calixtus II. and Eugenius III., and, with some modifications, have continued down to modern times as the rule of the Cistercian institute. Two of Stephen's letters are preserved among the *Epistolæ Sancti Bernardi* (Epp. 45 and 49). See Cistercians.

HARDINGE, här'ding, Sir Henry, first Viscount Hardinge of Lahore (1785-1856). An English field-marshal and commander-in-chief. The third son of the Rev. H. Hardinge, rector of Stanhope, Durham, he was born at Wrotham, Kent, on March 30, 1785. After a brief education at Eton, he was gazetted as ensign to the Queen's Rangers in Upper Canada before he had attained his fifteenth year. In 1806-07 he studied with success at the Wycombe Royal Military College. He obtained a brigade command in Spain before his twenty-fifth year, after which he was attached to the Portuguese Army from 1809 to 1813 in the capacity of deputy quartermaster-general. On Napoleon's return from Elba, Hardinge joined the allied armies in Belgium, and was appointed by the Duke of Wellington commissioner at the Prussian headquarters. He lost his hand at Ligny, and was unable to participate in the victory of Waterloo. In 1826 he entered Parliament, and in 1828 succeeded Lord Palmerston as Secretary of War. He next filled the office of Secretary for Ireland. From 1844 to 1847 he was Governor-General of India. When the Sikh

War broke out, he hurried to the northwestern frontier of India, and served as second in command under Lord Gough during the battles of Mudki, Ferozeshah, and Sobraon. After the pacification of Lahore, his services were rewarded by a viscounty, the East India Company granting him a pension of £5000, and Parliament voting him an annuity of £3000 for himself and his next two successors. On the death of the Duke of Wellington in 1852, Hardinge was appointed Commander-in-Chief of the British Army, and filled the home command during the Russian War. He resigned through illness a few months before his death. In October, 1855, he was advanced to the rank of field-marshal. He died September 24, 1856, at his seat, South Park, near Tunbridge, Kent.

HARD LABOR. As a form of criminal punishment, hard labor is comparatively modern. It was introduced in England as an alternative to transportation and penal servitude. It is the creation of statute law both in Great Britain and in this country. A court has no right to sentence a convicted criminal to hard labor, in addition to other punishment, unless a statute gives authority therefor. Hard labor is generally authorized by Federal as well as by State legislation, however, in most cases where the convicted criminal is subject to imprisonment in a State prison or penitentiary. The kind and amount of labor required of the sentenced criminal are regulated by statute or by prison rules. Consult: Stephen, *History of the Criminal Law of England* (London, 1883); *Encyclopædia of the Laws of England;* United States Revised Statutes, § 5542. See PUNISHMENT.

HARD'MAN, FREDERICK (1814-74). An English novelist and journalist. He was the son of Joseph Hardman, a London merchant, but, disliking the life in a counting-house for which his father intended him, went to Spain in 1834 and served against the Carlists. In 1840 he began contributing to *Blackwood's Magazine*, and after ten years of literary work became foreign correspondent of the London *Times*. Among his works are: *Peninsular Scenes and Sketches*, and *The Student of Salamanca*, both reprinted from *Blackwood; Central America* (1852); and a translation of Weiss's *History of the French Protestant Refugees* (1854).

HARDMOUTH. A fish. See CHISELMOUTH.

HARDNESS, SCALE OF. The hardness of a solid substance may be measured by its capacity for scratching, or being scratched by, other substances. The variations in degree of hardness presented by different minerals give valuable physical indications by which one mineral may be readily distinguished from others. The hardness of a given substance is generally determined with reference to a few well-known minerals, which form a standard 'scale of hardness,' as follows:

1. Talc.	6. Feldspar.
2. Gypsum.	7. Quartz.
3. Calcite.	8. Topaz.
4. Fluorite.	9. Sapphire.
5. Apatite.	10. Diamond.

Talc is easily scratched by the finger-nail; gypsum is not easily scratched by the finger-nail; calcite has about the same hardness as coin-copper; fluorite is not scratched by a copper coin, and does not scratch glass; apatite scratches glass with difficulty, and is easily scratched by a knife; feldspar scratches glass easily, and is not easily scratched by a knife; quartz is not scratched by a knife, and yields with difficulty to the file; topaz, sapphire, and diamond are all harder than flint.

HARDOUIN, är'dōō'ăn', JEAN (1646-1729). A French scholar, born at Quimper, in Brittany. He early entered the Jesuit Order, for a time lectured on rhetoric, and in 1683 became librarian in the Collège Louis le Grand, Paris. His attainments were notable, his vagaries profound. He prepared an edition (1685) of the *Historia Naturalis* of Pliny the Elder, of which Huet observed, with some exaggeration, that Hardouin had accomplished in five years a task for which five other savants together would have required fifty; and on the other hand, he solemnly adduced theories which involved him in controversy with many of the chronologists and antiquaries of his time, and disagreement with all, and provoked his superiors to demand a public recantation (1708). This curious archæologist declared that the greater part of the books commonly attributed to the ancients are in reality the work of Benedictine monks of the Middle Ages under the direction of a hypothetical Severus Archontius. He accepted as genuinely classic only Homer, Herodotus, Pliny the Elder, Cicero, the *Epistolæ* and *Satyræ* of Horace, and the *Georgics* of Vergil. In all other cases allusions to Christianity, references to historical events of the Middle Ages, or obvious allegory (as, for example, the *Æneid*, which describes the voyage of Saint Paul to Rome and the proclamation of the Gospel in Italy), determine a recent origin. Similarly all coins and medals pretending to be of the antique world are the work of modern artists. Also, despite all evidence, no council of the Roman Catholic Church was held previous to that of Trent. Hardouin's epitaph by Jacob Vernet, professor of theology at Geneva, well reads: "Hic jacet hominum paradoxotatos." His further publications include the titles: *Nummi Antiqui Populorum et Urbium Illustrati* (1684), and *Conciliorum Collectio Regia Maxima* (1714-15). Consult De Backer, *Bibliothèque des écrivains de la compagnie de Jésus* (Liège, 2 vols., 1853-54).

HARDPAN. The hard stratum of earth beneath the layer of surface soil, especially noticeable in alkali soils (q.v.). Sometimes this is produced in arable lands by the pressing of the plow and the trampling of the team; but it may be prevented or destroyed when formed, by plowing at varying depths.

'HARDS,' or **'HARD-SHELLS.'** The name of a short-lived faction of the Democratic Party in New York State.

HARDTAIL. The name sometimes applied to the yellow mackerel. See JUBEL.

HARD TIMES. A novel by Charles Dickens, which appeared as a serial in *Household Words*, and was published in 1854. The story is a satire on those who see nothing in life but statistics, illustrated by the leading character, Mr. Gradgrind.

HARDWAR, or **HURDWAR,** hŭrd-wär' (*Hari dwara*, gate of Hari or Vishnu). A frontier town of the Saharanpur District, United Provinces, British India, one of the most famous

spots on the Ganges (Map: India, C 3). It stands on the west bank of the river, at the mouth of a gorge where the waters emerge from the sub-Himalayas into the plains of Hindustan, and at the head of the Ganges Canal (q.v.). From its position on the sacred stream, it attracts immense numbers of pilgrims for the purposes of ablution. The chief feature is the Hari-ke-charan, or bathing ghat, with the adjoining temple of Gangadwara. The *charan*, or foot-mark of Vishnu, imprinted on a stone let into the upper wall of the ghat, forms an object of special reverence. The orthodox pilgrim season comprises the end of March and the beginning of April. In ordinary years the attendance amounts to 200,000 or 300,000; but on the occasion of every twelfth year a feast of peculiar sanctity takes place, the latest having occurred in 1894; the visitors, from the commencement to the close of this festival, are stated to have averaged about 2,000,000. Commerce mingles with religion in an annual fair, which possesses considerable mercantile importance, being one of the principal horse fairs in Upper India. Commodities of all kinds, Indian and European, find a ready sale, and the trade in grain and foodstuffs of the surrounding districts is considerable. Hardwar is 1024 feet above the sea, in latitude 29° 57′ N. and longitude 78° 14′ E. Population, in 1891, 29,125; in 1901, 25,597.

HARDWARE. A commercial term which includes an enormous variety of articles manufactured from iron, copper, brass, or bronze, and variously known as *carpenters'*, *housekeepers'*, or *builders'* hardware. It is almost impossible to classify the articles which come under the general term, including, as it does, implements and materials used by saddlers, miners, contractors, machinists, stationers, car-builders, and furniture makers and dealers. Many toys and the limitless varieties of what are called 'fancy' articles belong to this branch of manufacture, as indeed does almost any article not assignable to any other branch of trade. A typical hardware catalogue contains the list of a regular stock of nearly fifty thousand articles and sizes. Until the latter half of the nineteenth century the United States was almost wholly dependent on England and Germany for its hardware. Such implements as were made at home were usually the work of the village blacksmith, who was an individual of the first importance in those days. The manufacture of American hardware in general began about 1850, and has increased till now the American product is in many branches the standard for excellence the world over. A characteristic of American hardware is the neatness with which the finished product is packed and incased for the market.

HARD'WICK, Charles (1821-59). An English clergyman, born at Slingsby, Yorkshire. He was educated at Cambridge; was professor of divinity, Queen's College, Birmingham, 1853, and two years later lecturer on divinity at King's College, Cambridge. Soon after being appointed Archdeacon of Ely he was killed by falling over a precipice in the Pyrenees. He ranked high as a Church historian, his chief works being *History of the Articles of Religion* (1851); *History of the Middle Age of the Church* (1853; 6th ed. by Dr. William Stubbs, 1888); *History of the Reformation* (1856; 9th ed. by Stubbs, 1888); and *Christ and Other Masters* (1855-58; 3d ed. by Francis Proctor, 1874).

HARD'WICKE, Philip Yorke, first Earl of (1690-1764). An English jurist and Lord Chancellor, born at Dover. He was educated at a private school in Bethnal Green, was then apprenticed to a London solicitor, studied at the Middle Temple, and was admitted to the bar in 1715. The favor of Lord Macclesfield, together with his own talents and attractive personality, resulted in his rapid advance in the profession. In 1719 he was elected a member of Parliament for Lewes, and the following year for Seaford, which he represented until he became a peer. Within a few days of his first speech, in 1720, on the supremacy of the British over the Irish Parliament, he was appointed Solicitor-General, and three months later was knighted. In 1724 he succeeded to the Attorney-Generalship; in 1733 was appointed Lord Chief Justice of the King's Bench, and was created Baron Hardwicke of Hardwicke; and in 1737 he became Lord Chancellor. Among the chief events of his long career were his co-administration of the Government during the King's absences in 1740, 1748, and 1752; the punishment of Edinburgh for the Porteous riots in 1737; the pacification of Scotland after the Jacobite rebellion of 1744, wherein the wisdom of the abolition of heritable jurisdictions was somewhat counterbalanced by his injudicious proscription of the tartan; and the loss of Minorca and the trial and execution of Byng. To him is largely due the reduction of English equity to a scientific system of logical deduction. In 1754 he was created Viscount Royston and Earl of Hardwicke, and two years later he retired into private life. Consult Harris, *The Life of Lord Chancellor Hardwicke* (London, 3 vols., 1847).

HARDY, är'dē', Alexandre (c.1570-c.1631). A very fertile French dramatist, born in Paris. He is thought to have written 600 plays, of which 41 were printed (1624-28). Of these the best is *Mariamne*. He was an artisan rather than an artist, and first appears in 1593 as author for a strolling company of actors. In 1599 he filled a similar place in Lecomte's company at the Parisian Theatre of the Hôtel de Bourgogne. Of his life little else is known. In his dramas he emancipated the stage from the scholarly mannerisms of Jodelle (q.v.), and became the founder of popular secular tragedy in France. The scenic traditions remained, but Hardy ignored the classic unities of time and place, and soon discarded the chorus. Hardy had little stylistic or poetic talent, but he had dramatic tact and the instinct of stage effects, using old material freely for tragedies, tragi-comedies, and pastorals, which in freeing the French stage from the bondage of Latin, Spanish, or Italian models, made it an attractive field for literary men. Before Hardy's death, Théophile had written his *Pyramus and Thisbe*, Racan his *Shepherd Plays* (*Bergeries*), Mairet his *Sylvie*, Gambaud his *Amaranthe* (1617-25), all for the Hôtel de Bourgogne. He lived to see the first successes of Corneille (q.v.), and the first 'regular' French tragedy, Mairet's *Sophonisbe* (1639). Hardy's *Works* have been republished in 5 vols. (Marburg, 1884). Consult Rigal, *A. Hardy et le théâtre français* (Paris, 1889).

HARDY, Arthur Sherburne (1847—). An American novelist, diplomat, and writer on mathematics. He was born at Boston, graduated at West Point at the age of twenty-two, and served for some time in the army. He was professor of civil engineering, Iowa College, from 1871 to 1873, received the degree of Ph.D. from Amherst in the latter year, then studied abroad, and held the chairs of civil engineering (1874-78) and mathematics (1878-93) at Dartmouth. The latter position he resigned for the purpose of devoting himself to literary and diplomatic pursuits. He was United States Minister Resident and Consul-General at Teheran, Persia (1897-99); Minister to Greece, Rumania, and Servia (1899-1901); Minister to Switzerland (1901-02); and in 1902 was appointed Minister to Spain. His mathematical publications include the following: *Elements of Quaternions* (1881); *New Methods in Topographical Surveying* (1884); *Elements of Analytic Geometry* (1888); *Elements of Calculus* (1890); and a translation of Argand's work on Imaginaries (New York, 1881). He is better known by his fiction, which includes: *But Yet a Woman* (1883); *The Wind of Destiny* (1886); *Passe Rose* (1889). He is also author of two poetical works, *Francesca of Rimini* (1878) and *Songs of Two* (1900), and of the *Life and Letters of Joseph Hardy Neesima* (1891).

HARDY, Arthur Sturgis (1837-99). A Canadian statesman. He was born at Mount Pleasant, Ont.; was educated at the grammar school of his native town and at Rockwood Academy; studied law, and was called to the bar in 1865. After a period of successful law practice, he was made a Queen's Counsel in 1876. He entered political life in 1873, and was returned as Liberal member for South Brant in the Ontario Legislature. In 1877 he was made Provincial Secretary, and in 1899 Commissioner of Crown Lands in the Mowat Cabinet, and when the latter became a member of the Dominion Cabinet at Ottawa in 1896, Mr. Hardy became Premier and Attorney-General of Ontario. He was an active and very useful legislator, and in his term of office introduced many bills, most of which were passed, relating to railways, courts and legal procedure, sanitation, and liquor licenses.

HARDY, Sir Charles (c.1716-80). An English admiral. He was the son of Vice-Admiral Sir Charles Hardy, entered the navy in 1730, and in 1737 was promoted to be a third lieutenant. After serving on several ships he was sent in 1744 in charge of a convoy to Newfoundland. In this he was unsuccessful, and having been blamed for the loss of part of the convoy, was court-martialed, but was acquitted. In 1745 he commanded a ship off the coast of Portugal, where he fought a severe though indecisive action with a French man-of-war. Appointed Governor of New York in 1755, and rear-admiral of the blue the following year, he aided Admiral Boscawen in the siege and reduction of Louisbourg in 1758. He was second in command under Hawke during the blockade of Brest, and at the battle of Quiberon Bay was made vice-admiral in 1762, and admiral in 1770. The most important event in Hardy's professional life was his appointment to the command of the Channel Fleet in 1779, when an invasion by the combined French and Spanish fleets was imminent. He had only thirty-nine ships of the line against the enemy's sixty-six; but the allied admirals declined to attack, and returned to Brest.

HARDY, Gathorne. See Cranbrook, First Earl of.

HARDY, Thomas (1840—). An English realistic novelist, born in Dorsetshire. At the age of sixteen he was articled to an ecclesiastical architect in Dorchester. He studied for a time at King's College, London, and in 1863 received a prize from the Royal Institute of British Architects for an essay upon *Coloured Brick and Terra-Cotta Architecture.* He worked as an architect—especially in the Gothic School—under Sir A. Blomfield in London from 1862 to 1867, and though he deserted it for literature the following year, the influence of his early studies is left upon his writing. His desire for scientific precision sometimes leads him to the introduction of technical words and phrases, which mar the otherwise severe simplicity of his style. The architect is perforce the antiquary, and from the days when Hardy took professional excursions to different village churches to see if they were worth restoring, he steeped himself in the lore of his native county, which he calls Wessex.

His first publication was an article in *Chambers's Journal* (March, 1865), entitled *How I Built Myself a House,* and after an unsuccessful attempt, called *The Poor Man and the Lady,* which George Meredith advised him to reconsider, he brought forth his first novel, *Desperate Remedies* (1871), a crude and fantastic effort, but interesting as illustrative of the author's formative stage. He struck a surer note in *Under the Greenwood Tree* (1872), an idyllic love story, or, as the title-page has it, "A Rural Painting of the Dutch School." Here, the lightness of touch is equaled in none of his later work. *A Pair of Blue Eyes* (1873) marked Hardy's progress in the study of the whimsicalities of womankind, and their resultant tragedy; but *Far from the Madding Crowd* was the book which first gained him popular favor. While running as an anonymous serial in the *Cornhill Magazine* throughout the year 1874, it was attributed to George Eliot, not from any similarity of style, but because no other living author was considered capable of writing it. A farcical production, called *The Hand of Ethelberta: A Comedy in Chapters* (1876), illustrated by George Du Maurier, preceded *The Return of the Native* (1878), the first really great work of Hardy, and one which by some is even regarded as his masterpiece. By this time he had shaken off self-consciousness, invention had given place to imagination, and he was able to create dramatic characters and situations worthy of their inimitable stage setting, Egdon Heath. His description of that wild moorland, in the opening chapters, is a fitting introduction to the stormy lives that are mingled with it; and here the author's feeling for nature is most vividly illustrated. In *The Trumpet Major* (1880), he returned to his earlier manner of the *Greenwood Tree* and the *Madding Crowd* without attaining the graceful charm of the one or the strength of the other. Hardy is supreme in his own Wessex; here, he exhibits, on the one hand, a high degree of sensibility to the delights of her rural life, and, on the other, the keenest sympathy with the rustic point of

view. When he forsakes the types of these regions, the result is not convincing. *A Laodicean* (1881) justifies the name, in being neither cold nor hot. The tale *Two on a Tower* (1882) develops a very curious and complicated situation with much skill. But he is tethered to Wessex, and paints more confidently on that background, in *The Romantic Adventures of a Milkmaid* (1883), and in the *Mayor of Casterbridge: The Life and Death of a Man of Character* (1886), a title which is no misnomer. Henchard, the hero, is a strongly drawn personality, to whose level the author has been climbing, through similar types of men.

The Woodlanders (1887), though flanked by *The Return of the Native* and *Tess of the D'Urbervilles*, suffers from comparison with neither, expresses the same intimate kinship of man with nature, and gives like instances of true nobility engaged in the lowliest occupations. Of the *Wessex Tales* (1888), gathered from different magazines, the strongest is *The Three Strangers* (*Longman's*, March, 1883), which was dramatized under the title *The Three Wayfarers*, and produced at Terry's Theatre, in London (1893), eleven years after Comyns Carr's version of *Far from the Madding Crowd* had been seen in Liverpool, and in the Globe Theatre, London. Another collection of short stories entitled *A Group of Noble Dames* (1891) preceded the publication of *Tess of the D'Urbervilles: A Pure Woman Faithfully Presented* (1891), through which Hardy became most widely known. Whatever may be said for or against the purity of the woman, there cannot be two opinions regarding the vividness of the presentation, although the art of *Tess* is marred at times by philosophic digressions that do not match the remainder of the literary fabric. Yet it is doubtful if any one of Hardy's stories holds the reader's interest more closely, or makes a stronger appeal to his sympathies, than does this tragedy of Tess. Nor is there anywhere in Hardy's writing more convincing insistence upon a logical connection and a consequent force of uncontrollable circumstance, or more relentless reiteration of the idea that man may be forced to reap where he has not sown. Whether here, and elsewhere when he writes in this vein, Hardy reveals himself a fatalist, or a rigid moralist, is a question which will be answered largely in accordance with the temperament of the reader. A dramatization of *Tess*, made by Lorrimer Stoddard (1897) and taking no more than the usual liberties with the original plot, gave Mrs. Minnie Maddern Fiske (q.v.) the means for bringing out even more effectively than does the author, the subtle characterization of the heroine.

Whatever else may be said of *Jude the Obscure* (1895), it seems quite apparent that here Hardy gives the fullest expression to his genius for minute and merciless character analysis. There is even a feeling, at times, that the psychology is in danger of being refined into nothingness. The story of Jude's early discouragements in his efforts to get a university education is said to be autobiographical to a certain extent. The whole is a harrowing, and yet in the main convincing, study of the degradation of a character cursed from the outset with certain of the most dangerous moral weaknesses, which are steadily cultivated by cunningly conceived circumstances and plausibly arranged episodes. It can scarcely be denied that both of these books are literary masterpieces in their genre; and consideration of the remarkable fertility and resourcefulness of expression which each displays, makes the more inexplicable their author's occasional descent to the employment of indelicate metaphor and frankly indecent 'realism.'

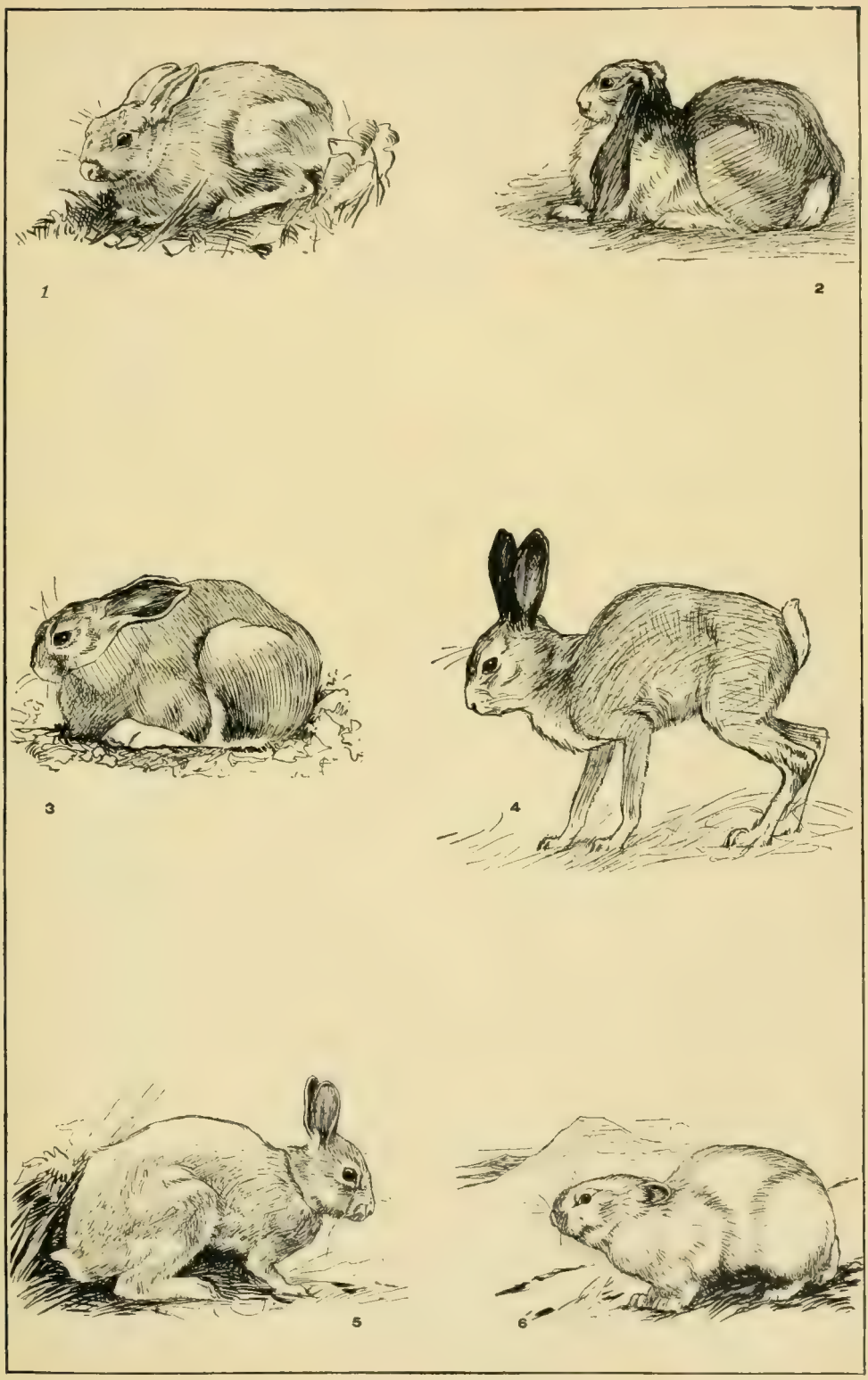
Life's Little Ironies (1894) are short stories evidencing Hardy's grim sense of humor no less than his appreciation of values. He knows and shows how few among the coveted prizes of life are worth a struggle. *The Well-Beloved*, which was serially published in 1892, and in book form five years later, is of less importance. The reciprocal feeling of his native county found expression in his appointment as one of its magistrates (1894). Some of Hardy's earliest efforts were in verse, and the stray poetical productions of thirty years were collected in two volumes, *Wessex Poems* (1899) and *Poems of the Past and Present* (1901). They bear his mark in the saturnine flavor of some, the sympathy with the country and country-folk of others, the patriotic English sentiment of all; but the instrument is not his own. He is hampered by the requirements of rhyme and rhythm, and has but little to say which he might not have expressed at least more spontaneously in prose. Consult: W. Sherren, *The Wessex of Romance* (London and New York, 1902); and Windle, *The Wessex of Thomas Hardy* (London and New York, 1901); Macdonell, *Thomas Hardy* (London, 1894); and Johnson, *The Art of Thomas Hardy* (London, 1894).

HARDY, Sir Thomas Duffus (1804-78). An English paleographer, born at Port Royal, Jamaica. He succeeded Petrie as editor of the *Monumenta Historica*, published in 1848. As deputy keeper of the new Record Office he did much to make all records accessible to the public, and brought to London the muniments of the three palatinates. He edited many of the rolls for John's reign: *A Descriptive Catalogue of MSS. Relating to the History of Great Britain and Ireland* (1862-71); *Registrum Palatinum Dunelmense* (1873-78); *Catalogue of the Lords Chancellors, etc.* (1843); and articles on the date of the Athanasian creed.

HAR'DYNG, John (1378-c.1466). An English chronicler. He was page to Sir Henry Percy, whom Shakespeare has immortalized as 'Harry Hotspur,' and went to the wars with his master. His rhyming chronicle, a curious but entirely unreliable document, evidences the profundity of his historical knowledge and his adaptability in treating current events in a manner pleasing to his patrons. Ellis's modern edition of this *Chronicle of England unto the Reign of King Edward V.* was published in 1812.

HARE (AS. *hara*, Icel. *hare*, OHG. *haso*, Ger. *Hase*, hare; connected with OPruss. *sasnis*, OIr. *ceinach*, Skt. *śvaśura*, for **svaśura*, hare). One of a genus of rodent quadrupeds, of which there are many species very similar to each other. The Linnæan genus Lepus now forms the family Leporidæ, of which a peculiar characteristic is the presence of two small incisors immediately behind the ordinary rodent incisors of the upper jaw, so that these teeth seem to be double. This peculiarity is also found in the pikas (q.v.). The

HARES AND PIKA



1 COMMON EUROPEAN RABBIT (Lepus cuniculus).
2. LOP-EARED RABBIT (domestic variety).
3. VARYING HARE (Lepus Americanus).
4. BLACK-EARED JACK-RABBIT (Lepus melanotis).
5. COTTON-TAIL (Lepus sylvaticus).
6. ROCKY MOUNTAIN PIKA (Ochotona princeps).

molar teeth, six on each side above and five below, are transversely grooved, and are formed of two vertical plates soldered together. All the animals of this family feed exclusively on vegetable food, and chiefly on herbage, although they are also fond of grain, roots, and the bark of trees. Their fore feet have five toes, their hind feet four; the soles are hairy. Their fur is soft; the colors mostly gray or brown. The alpine and arctic species become white in winter; and all, except one Indian species, have white upon the under surface of the tail. As this is invariably upturned in flight, it is regarded by naturalists as a recognition mark by which the young or companions may keep in view and follow their flying leader. From this characteristic arises the name 'cottontail,' popularly given to one of the smaller American hares. The black markings which become so conspicuous upon the ears of several species when they are lifted serve a similar purpose, and all disappear when the animal squats, and it then presents to the eye of the searcher only a neutral-tinted back. Hares thus offer good illustrations of 'protective coloration' and 'recognition marks' (qq.v.). The rabbit also belongs to this family, but it is so different in many ways that it is described by itself. It may be said, in passing, that although the term 'rabbit' is used generally for all kinds of leporine animals in North America, where the true rabbit does not exist, it belongs exclusively to the burrowing *Lepus cuniculus* of Europe; and all others of the family, including all the American species, should be called hares. About thirty species of Lepus are known, of which one is found in South America and some twenty in North America.

Hares of the Old World. The type of the family is the common hare (*Lepus Europæus*), which is found all over Europe, except in Ireland, Scandinavia, and the north of Russia. Its length is from 20 to 22 inches, and its usual weight seven or eight pounds. Another familiar Old World species is the mountain or Alpine hare (*Lepus timidus*). This occurs in Ireland, all over Northern Europe and Asia, and in the Pyrenees, Alps, Caucasus, and thence east to Japan; while the Polar hare of America is regarded by some naturalists as identical with it. It is considerably smaller than the common hare, and has a rounder head, with shorter ears, hind legs, and tail, and a lighter-colored coat, which, at least in the colder parts of its range, turns white in winter. In Central Asia are found several other species, some of which are confined to the higher slopes of the great mountain ranges. A remarkable species is the Indian or hispid hare (*Lepus hispidus*), of the foothills of the Eastern Himalayas. This hare has coarse, bristly ears, which are shorter than the skull, small eyes, a tail which is dark below and above, and hind legs only a little longer than the front ones. It is not a gregarious animal, but it is said to burrow as a rabbit does, and its young, therefore, are probably born naked and blind. It is reported that its flesh is white. Sumatra has an allied species. In Africa several species of hares inhabit the more open parts of the continent from the Sahara to the Cape. The habits of all these (except the hispid) are much alike.

The members of this family live among rocks and bushes, or in open country among the grass and brush. Each has a 'form' in the grass or sheltered by a rock, and sometimes returns to this form every day for much of the year. Hares feed at night, are mainly nocturnal in their movements, and do not return to their forms until sunrise. Because of the greater proportionate length of their hind legs, they run up hill more easily than down, and they develop great speed. All the members of the genus are remarkable for their extreme timidity, yet they are often bold and courageous in defense of their young, and pugnacious toward others of their own race. Their angry stamping upon the ground with the hind feet is well known to all countrymen. With these hind feet they can deliver powerful blows, and this is their method in fighting. The hare never becomes fat, but its flesh is excellent food. Though shot and trapped, the ordinary method of hunting it, as a sport, is by coursing with greyhounds—a sport of classic antiquity. (See Coursing.) It is a prolific animal, although not nearly so much so as the rabbit. The female produces from two to five at a birth, and may begin to breed at six months of age, and produce two or three broods a year. The young (*leverets*) are born covered with hair, and with the eyes open. When, as in the case of the hares of California, their natural enemies—beasts and birds of prey, and serpents—are greatly reduced, this multiplication goes on with little to check it, while if the food-supply is yearly added to by enlarging plantations, the increase may be so rapid that the animals become a serious menace to agriculture, and special efforts must be made to keep them down.

American Hares. The Canadian Polar hare is a variety (*arcticus*) of the European northern hare, and turns from its brownish grizzle in summer to pure white in winter. It comes little south of the Arctic Circle, except on the east coast, where it is to be found in Labrador and Newfoundland. Other American hares turn white in winter, however. The most conspicuous of these is the 'varying' hare (*Lepus Americanus*), which is distributed from the middle parts of the United States throughout the northern parts of the continent wherever forests grow. It shows a great variety of reddish and brownish tints, always with the tips of the ears black behind, and in winter among northern specimens only these black ear-tips relieve the snowy white of the pelage; but southern specimens often make only a partial change of coat. On the Western plains and in California are found several species of large hares of gaunt form and immense ears, naturally called 'jack-rabbits' ('liebres' by the Mexicans). Just how many species and subspecies of these there are, naturalists are not yet agreed, but practically five may be recognized. These include the white-tailed hare and the various black-tailed rabbits. The white-tailed or prairie hare (*Lepus campestris*) is found all over the plains north of Kansas and throughout the Utah Basin. It is the only jack-rabbit whose coat turns white in winter, and it may be recognized in summer by the fact that its tail is entirely white. The tails of the other jack-rabbits are more or less black on the top—a fact easily seen, as none of this group of hares turns up its tail as do the wood-hares. Among the Western black-tailed rabbits are: (1) A buff-bellied species found in California and southwestern Oregon (*Lepus Californicus*); (2) a large, long-limbed species inhabiting southern Arizona and Sonora, known as Allen's hare (*Lepus Alleni*); (3) a

widely distributed white-bellied animal with long ears, occurring in the Great Basin, and commonly known as the Texan jack-rabbit (*Lepus Texanus*); and (4) the tall black-eared jack of the Great Plains (*Lepus melanotis*). It is doubtful whether any real distinction exists between the two last named, and the jack-rabbit of the southern plains may be said to extend westwardly to the Pacific Coast.

These hares of the plains do not burrow, nor seek the protection of holes or shelter of any kind, beyond that afforded by a thicket of brush which may shield them from the winter's wind or the equally dreaded rays of the midsummer sun. Some dwell in a region where the winter temperature may fall as low as 50° F. below zero; others where the noonday sun heats the air to 140° and makes the rocks unbearable to touch; some in rich valleys, others on the sourest of deserts; yet all thrive with that remarkable adaptability to varying conditions which must be reckoned with in any consideration of these animals as a pest. Their food consists of grass, herbage, and largely of bark. It is difficult to find any considerable extent of country which does not supply enough of this fodder for a population of hares, and as they drink but little, they do not suffer from the lack of water even in an almost desert land, for the moisture in the ordinary desert herbage seems to be all they require. They have comparatively few enemies, against which they are guarded by their invisibility when crouched in their 'forms'; by their senses of sight and smell; and by the remarkable acuteness of their hearing, for the augmentation of which the great ears have been developed. If danger comes too near they can usually escape it by flight—a word that approaches literal accuracy as a description of the series of high bounds, each 15 to 20 feet in length, with which their great hind legs carry them over the ground.

They multiply rapidly, yet are not so fecund as is frequently alleged. Those in the arid Southwest seem to produce only one to three at a birth, but have several broods a year, between January and September; while the Northern species breed no more than twice, as a rule, with four to six young in a litter. Most births fall in April, May, and June. The period of gestation is about thirty days. The young are born fully furred, with their eyes open, and often with several teeth in sight. They attain their full size (but not weight) in about two months. It will be seen that at this rate of increase, under such favorable conditions as are brought about in the West by irrigation, agriculture, and the diminution of serpents and birds and beasts of prey, the danger from an over-population of hares is very great; and for many years this has been a serious pest. Large sums have been spent on 'rabbit-proof' fences, and on various devices for excluding the animals from fields and orchards; and still larger losses have occurred through the absence or failure of protection. The principal measure has been that of the periodical 'drive.' All the men and boys and many women and girls of a given district gather in a circle about a square mile or more of space, and drive the hares into an inclosure, where they are slaughtered with clubs. These battues have been most numerous, systematic, and effective in southern California, though occasional wherever the necessity arises, and in the San Joaquin Valley have so reduced the hares that they are no longer dangerous. Students of the problem have concluded, however, that 'driving' is only a partial and a demoralizing remedy; and assert that the only true safety for crops and orchards lies in the rabbit-proof fence. A complete discussion of this matter, with its history, statistics, and teachings, together with much information as to the utilization of the American hares as food and for their skins, hair, etc., may be found in Palmer, *The Jack-Rabbits of the United States* (Department of Agriculture, Washington, 1896); Beddard, *Mammalia* (London, 1902).

Wood-Hares. Of the smaller hares, the wood-hare or 'cottontail' (*Lepus sylvaticus*) is the 'common rabbit' of the United States, where it is scattered from the Atlantic to the Pacific, but does not extend far north. It is about 18 inches long, gray, more or less varied with black above, and somewhat tinged with yellowish brown; white below; tail cottony white; ears two-thirds the length of the head. The little marsh-hare (*Lepus palustris*), whose tail is not grayish nor cottony, and the water-hare or 'swamp-rabbit,' are familiar Southern species, the latter large and yellowish brown, white below.

Consult Audubon and Bachman, *Quadrupeds of North America* (New York, 1856); Stone and Cram, *American Animals* (New York, 1902); Sharp, *Wild Life Near Home* (New York, 1901); Thompson, *Wild Animals I Have Known* (New York, 1898).

See Rabbit; Pika; and Plate of Hares and Pika.

Hare Kangaroo. One of the small banded wallabies (q.v.) of the genus Lagostrophus, which resemble hares, and have habits singularly like that animal's. They inhabit swampy districts on the west coast of Australia, and make refuges for themselves by forming tunnels through the dense scrub, biting away twigs and branches until a clear passage and chamber are formed.

Hare. In point of law, one of the wild animals called game, which are specially protected by game laws. The close season for hares is regulated in this country by State legislation. See Game Laws.

HARE, Augustus John Cuthbert (1834-1903). An English author, the nephew of Julius and Augustus Hare. He was born in Rome, and educated at Harrow and at University College, Oxford. The results of his travels he has given in guide books and other works of the highest value. Among them are: *Walks in Rome* (1870); *Cities of Northern and Central Italy* (1875); *Walks in London* (1877); *Cities of Southern Italy and Sicily* (1882). His *Story of My Life* (6 vols., 1896-1900) is full of delightful reminiscences of many celebrated people; and his *Memorials of a Quiet Life* (1872-76) is a charming biography of his aunt and uncles. To him we are also indebted for the only good life of Maria Edgeworth (1894).

HARE, Augustus William (1792-1834). An English clergyman, brother of Julius Charles Hare. He was born in Rome, and was educated at Winchester and New College, Oxford, where he attacked several ancient customs, and became founder of the Attic Society. He had been adopted (1798) by the widow of Sir William Jones, his godfather, but broke with her because

of his refusal to qualify for the valuable living of Hurstmonceaux, formerly held by his father, and in the gift of the Jones family. He was a tutor at New College for several years, and became rector of Alton-Barnes, a small rural community, where he lived from 1829 until poor health drove him to Rome, where he died. He wrote *Sermons to a Country Congregation* (1837), and, with his brother, *Guesses at Truth* (1827). Consult A. J. C. Hare, *Memorials of a Quiet Life* (London, 1872).

HARE, George Emlen (1808-92). An American clergyman, born in Philadelphia. He graduated at Union College in 1825, became a priest of the Protestant Episcopal Church, was rector of Saint John's, Carlisle, Pa. (1830-34); of Trinity Church, Princeton, N. J. (1834-43); and of Saint Matthew's, Philadelphia (1845-52). He had had charge of the Episcopal Academy during a part of his pastorate at Saint Matthew's, and was made instructor in the diocesan training school and, after its development into the Philadelphia Divinity School, a professor of biblical learning, and then (1881) of New Testament literature in the latter institution. He wrote: *Christ to Return* (1840); and a volume of sermons, *Visions and Narratives of the Old Testament* (1889).

HARE, John (1844—). A well-known English actor and manager. He was born in London; was educated in Yorkshire; and made his first stage appearance at the Prince of Wales Theatre, Liverpool. Soon afterwards (1865) he came to the London Theatre of the same name, where he was very popular in the comedies of T. W. Robertson, with some of which in later years he toured in America. In 1875 he became manager of the Court Theatre, where he brought out *Olivia, A Scrap of Paper,* and other pieces. With Mr. Kendal at the Saint James Theatre (1879-88) he produced *Still Waters Run Deep* and *The Ironmaster.* In 1889 he assumed the management of the Garrick Theatre, and afterwards appeared with several of A. W. Pinero's plays, notably *The Notorious Mrs. Ebbsmith* and *Lady Bountiful.* He took the Globe Theatre in 1897, producing *A Bachelor's Romance* there, and in 1899 Pinero's *The Gay Lord Quex,* which he brought to America in the season of 1900-01. Consult: Pemberton, *John Hare, Comedian* (London, 1895); Scott, *The Drama of Yesterday and To-day* (London, 1899).

HARE, John Innes Clark (1817—). An American jurist, born in Philadelphia. He was educated at the University of Pennsylvania, was admitted to the bar in 1841, was associate judge of the Philadelphia district court (1851-67), then its presiding judge (1867-75), and from 1875 to 1895 was presiding judge of the Court of Common Pleas in the same city. In 1868 he received the degree of Doctor of Laws at the end of ten years' service as a trustee of the University of Pennsylvania, in which he served for many years as professor of the institutes of law. He wrote: *American Leading Cases,* with Horace B. Wallis (1847); *The Law of Contracts* (1887); and *American Constitutional Law* (1889); and edited: *Smith's Leading Cases in Law* (1852); *White and Tudor's Leading Cases in Equity* (1852); *Hare on Contracts* (1887); and *The New English Exchequer Reports.*

HARE, Julius Charles (1795-1855). Archdeacon of Lewes, a well-known English writer. He was born at Valdagno, 50 miles northwest of Venice, Italy, September 13, 1795. While still a boy he passed a winter at Weimar (1804-05), where he met Goethe and Schiller, and gained a knowledge of German literature which influenced his style and sentiments throughout his whole career. On the death of his mother in 1806, he was sent to the Charterhouse in London, where he remained until 1812, when he entered Trinity, Cambridge. There he became fellow in 1818, and after traveling abroad he began to read law in London in 1819. In 1822 he was appointed assistant tutor at Trinity College, which position he retained for ten years. Turning his attention from law to divinity, he was ordained in 1826. In 1827 appeared the *Guesses at Truth by Two Brothers,* written by Hare and his eldest brother, Augustus William (q.v.). On the death of his uncle in 1832 he succeeded to the rich family living of Hurstmonceaux, in Sussex, where he accumulated a library of 12,000 volumes, especially rich in German literature. Before taking up his residence in his parish, he once more went abroad. In 1840 Hare was appointed Archdeacon of Lewes, and in the same year preached a course of sermons at Cambridge, *The Victory of Faith* (3d ed. by Plumptre, 1874); followed in 1846 by a second, *The Mission of the Comforter* (3d ed. 1876). In 1853 he became a Queen's chaplain. He was eminently unfitted to be a country parson, but did much better as an archdeacon. His sermons and charges were unmercifully long because he considered not at all the patience and interest of his auditors. But withal he was a scholar and a conscientious worker. He died at Hurstmonceaux, January 23, 1855. For his biography, consult A. J. C. Hare, *Memorials of a Quiet Life* (London, 1872).

HARE, Robert (1781-1858). An American chemist, born in Philadelphia. As a boy he was employed in his father's brewery, and had little spare time for study, but he managed to gain a considerable knowledge of chemistry and physics, and in 1801 invented the oxyhydrogen blowpipe. For this the American Academy of Boston awarded him the Rumford medal. He was professor of chemistry at the University of Pennsylvania from 1818 until 1847, and subsequently was an honorary member of the Smithsonian Institution. He made many ingenious and practical inventions of laboratory apparatus, and wrote a number of papers on scientific subjects, in addition to which he published: *Brief View of the Policy and Resources of the United States* (1810); and *Chemical Apparatus and Manipulations* (1836). His collection of chemical and physical apparatus is preserved by the Smithsonian Institution.

HARE, William Hobart (1838—). An American clergyman, bishop of the Protestant Episcopal Church. He was born at Princeton, N. J., and was educated at the University of Pennsylvania. He preached in Philadelphia until 1870; was for three years the general agent of the foreign committee of the Board of Missions, and was then elected Missionary Bishop of Niobrara. In 1883 his diocese was extended to include the State of South Dakota. He wrote several pamphlets on missionary work in the West.

HAREL, ä'rĕl', Paul (1854—). A French poet and innkeeper, born at Echauffour. He suc-

ceeded his grandfather as host of the inn *A la Croix Saint-Andre*; early showed himself master of a simple and beautiful lyric style; was elected a member of the Academy of Caen; and in 1887 received a prize from the French Academy. He published: *Sous les pommiers* (1879); *Gousses d'ail, et Fleurs de serpolet* (1881); *Les vingt-huit jours du caporal Ballandard*, with Le Vavasseur (1882); *Rimes de broche et d'épée* (1883); *Aux champs* (1886); *La hauterie* (1889); the less successful play, *L'herbager* (1891); and *Voix de la glebe* (1895).

HARELIP. A deformity of the lip, frequently involving also the roof of the mouth, consisting of a cleft through these structures, to one side of the median line, or on each side of it. Median fissure occurs at times, but is very unusual. It exists at birth, and the lip should be repaired during early infancy by operation. The cleft palate should be left till the bones have fully developed with adult life, and may then be repaired, or the opening may be closed with an obturator. In the ordinary (single cleft) form, the mouth of the babe resembles that of a cat or hare. The double-cleft palate is rare. See DEGENERACY.

HARELIP, or **CUTLIPS.** An elongated sucker (*Lagochila lacera*), common in clear streams of the central Mississippi Valley. It is remarkable for having the lower lip divided into three distinct lobes, and otherwise strangely modified. Hence many local names, as 'splitmouth,' 'rabbit-mouthed sucker,' and 'pea-lip sucker.'

HA'REM (Ar. *kharîm*, forbidden, from *kharama*, to exclude). The name given in Mohammedan countries to the apartment in a dwelling set aside for the female members of the household. The term is also applied to the ground around a mosque, and particularly to the mosques at Mecca and Medina. The Koran enjoins that women shall be discreet in their association with the other sex, and forbids them to expose face or person except to a husband, father, son, or certain intimate male relatives (Sura xxiv. 31; xxxiii. 53-55). But such injunctions are not peculiar to Islam, and the extraordinary precautions observed by Mohammedans with respect to their women represent a deeply rooted Oriental idea much older than the rise of Islam. The setting aside of a special apartment for women in a house is but one of these precautions, and undoubtedly antedates the time of Mohammed. The excavations conducted at Susa by Dieulafoy indicate that the palaces of the Persian kings contained a separate wing for the women, a view which is in accord with certain allusions in the Book of Esther (v. 12; vii. 1). In other books of the Old Testament there are also allusions to a special woman's apartment, and from the fact that in Babylonian *kharimtu* is one of the names for woman, we may conclude that already in ancient Mesopotamia the women were kept in a greater or lesser degree of seclusion. It is, however, due to the influence of Islam that the harem as an institution has been so rigidly maintained in the East. It is at the risk of life that a non-believer or a male Mohammedan who does not fall within the prescribed category of husband, father, son, or other intimate relative enters the harem of a Mohammedan householder, to which there is always a separate entrance. While within the household the social intercourse between husband and wife is quite free, the wife or the wives of a man, attended by servants, mostly females, lead to a large extent isolated lives. The women visit one another, and spend most of their time in each other's apartments. Restrictions of various kinds are imposed on them when they leave these apartments. They are to be veiled when appearing in the street, are accompanied by a male servant, and it is equivalent to loss of caste for a woman to be seen in company with a man unless veiled and in the presence of her husband. The harem as an institution is not necessarily connected with polygamy, for although a Mohammedan has by the law of the Koran the right to take four wives, there are comparatively few householders who avail themselves of this rather costly privilege. One wife or a wife and a concubine form the rule, and it is mostly in the case of persons occupying a high official position that several wives are gathered together under one roof. By an unwritten law the Sultan has the right to seven wives, and an indefinite number of concubines, but it should be added that the tales of an extensive harem maintained by the rulers of Turkey are largely exaggerated, and rest upon a confusion between actual wives (or concubines) and female attendants and slaves, of which there are of course large numbers in a royal household. The harem customs and the treatment accorded the women vary considerably in the various Mohammedan countries—Egypt, Syria, Arabia, Persia, Turkey, and India. In general more liberties appear to be allowed the women of the harem in Turkey and India than elsewhere; but it must be remembered that even where the women are under the strictest surveillance, long-standing custom has deprived the technical imprisonment of any sense of degradation; and from the Mohammedan point of view, it is not for the purpose of humiliating women that the harem as an institution has been introduced. Care is exercised to preserve the position of the 'chief' wife, who takes rank above the others. In case a man has several wives, the latter may exact of their husband that each be provided with a separate apartment, consisting of at least a bedchamber and a kitchen. Within the harem, however, the woman reigns supreme; there she entertains her female friends, and there, surrounded by attendants to look after her wants, she spends her days with her children. The most objectionable features of the harem from the sociological and moral point of view are the idleness and vacuity of the life there, and the time-honored employment in large and particularly in royal households of eunuchs as supervisors of the harem and as attendants. Most of the tales of cruelty, immorality, intrigue, and crime to be found in works descriptive of harem life in the past may be traced to these features. Consult: Lane, *Manners and Customs of the Modern Egyptians* (London, 1837); Emmeline Lott, *Harem Life in Egypt and Constantinople* (London, 1869). Lady Mary Wortley Montagu's letters may be consulted for descriptions of harem life in the Sultan's household in the eighteenth century, but the picture is only in a measure applicable to present conditions.

HAREN, hä'ren, WILLEM VAN (1710-68). A Dutch poet, born at Leeuwarden. He studied there, at Franeker under Hemsterhuys and Heineccius, and at Groningen in the home of Jean

Barbeyrac. In 1728 he succeeded to the Castle of Henkenshage, at Saint Anna Parish, after the death of his grandfather. The castle was burned four years later, with many valuable papers. It was rebuilt in 1734; but the fire seemed the beginning of misfortune for him, and in 1768 he committed suicide, discouraged by financial losses. He wrote: A lyric, *Leonidas* (1742), urging Holland to join in the War of the Austrian Succession; *Lierganzen* (1742), which with *Leonidas*, was republished in 1824; and an epos, *Friso* (1742 and 1758). His brother, ONNO ZWIER (1713-79), was a patriot and poet, too. He wrote *De Geuzen* (1772) and several dramas, of which *Agon* (1769) is the best. The collected works of the two brothers were published in 1854. Consult Van Vloten, *Leven en Werken van Willem en Onno Zwier van Haren* (Deventer, 1872-74).

HARFLEUR, är'flēr' (called in the Middle Ages *Hareflot*). A town in the Department of Seine-Inférieure, France, near the mouth of the Lézarde, about four miles east of Havre (Map: France, G 2). The chief building is a beautiful Gothic church with an elegant tower supposed to have been constructed by Henry V. of England. Population, in 1901, 2686. In former times, before the rise of Havre, Harfleur was a flourishing town, and the key to the entrance of the Seine. It was taken by the English under Henry V. in 1415, retaken by the French in 1433, again seized by the English in 1440, and ten years later recaptured by Charles VII. of France.

HAR'FORD, JOHN SCANDRETT (1785-1866). An English biographer, born in Bristol, of Quaker parents. He was educated at Cambridge, but received an honorary degree from Oxford in 1822. He gave financial aid in the restoration of the Llandaff and Saint David's cathedrals, while he and his brother gave the ground for the erection of Saint David's College, Lampeter, Wales. The friend of Wilberforce and Hannah More, who immortalized him as *Celebs in Search of a Wife*, Harford was a philanthropist, but an anti-socialist, less of a hero than a hero-worshiper, and wrote such excellent biographies as *R. V. Pryor* (1808); *T. Paine* (1820); *T. Burgess, Bishop of Salisbury* (1840); and *Rev. Richard Chapple Whalley, Rector of Chelwood* (1846). Perhaps his most important work is contained in the *Memoirs of Michael Angelo, Savonarola, Raphael, and Victoria Colonna* (2 vols., 1857).

HAR'GOOD, Sir WILLIAM (1762-1839). An English admiral. His first voyage began when he was thirteen years old, at which time he went to Newfoundland on the *Romney*. After service on other vessels, including the *Hebe*, on board which he had Prince William Henry, afterwards William IV., for a shipmate, Hargood was made commander of the *Swallow* in 1789. Three years later he was captain of a frigate taken by the French, and was court-martialed for surrendering too easily, but was honorably acquitted. His next experience was with mutineers on the *Leopard* in 1797, and the following five years he spent in Chinese and East Indian waters. In 1804-05 he was acting under Lord Nelson and was present at Trafalgar, when his ship, the *Belleisle*, and her crew suffered severely, as she was one of the first in action. Hargood's further services in North America, the West Indies, the Mediterranean, the Adriatic, and elsewhere were rewarded by his appointment to the command of the Channel Squadron, with the rank of admiral (1831), and subsequently to the chief command at Plymouth (1833-36). He was knighted by the King, who ever retained for him a friendly regard.

HARGRAVES, här'grāvz, EDMUND HAMMOND (1816-91). The discoverer of the gold-fields of Australia, born at Gosport, England. He was engaged in sheep-farming at Sydney, Australia, from 1834 to 1849, and spent the years 1849-50 in California. From the similarity in geological structure of the California gold-bearing districts to the west side of the Blue Mountains, in New South Wales, he concluded that there might be gold deposits in the latter place also. Accordingly he returned to Australia in 1850, was instrumental in the discovery of the Australian gold-fields in February, 1851, and made the first announcement regarding them to the Colonial Secretary at Sydney. He acted for a time as a Commissioner of Crown lands, and in 1853 was awarded the sum of £10,000 by the Legislative Council of Sydney. In 1877 the New South Wales Parliament voted him a pension of £250. He published *Australia and Its Gold-Fields: A Historical Sketch of the Progress of the Australian Colonies . . . with a Particular Account of the Recent Gold Discoveries* (1855).

HARGREAVES, här'grēvz, JAMES (?-1778). Inventor of the carding-machine and the spinning-jenny. He was an artisan at Stanhill, in Lancashire, where probably he was born. Hargreaves was an illiterate man, and supported himself and family by weaving and spinning, which, according to the custom of the time, he carried on in his own house. In 1760 he invented the carding-machine as a substitute for the use of hand-cards, and four years later he produced the spinning-jenny. Hargreaves had frequently tried to spin with two or three spindles at once, holding the several threads between the fingers of his left hand; but the horizontal position of the spindles frustrated his attempt. One of his children, however, is said to have upset the spinning-wheel while he was at work, and as he retained the thread in his hand, the wheel continued revolving horizontally and the spindle vertically. The observation of these motions produced the thought that if a number of these spindles were placed upright and side by side, many threads could be spun at once. Hargreaves now put his idea into practice, and constructed the jenny, at which he and his family worked. A few of these machines were sold and served to increase eight times the work of the spinner. This success led his fellow-spinners, who were imbued with strong prejudices against machinery, to break into his house and destroy his frame. He then removed to Nottingham in 1768, where he erected a spinning-mill. Two years later he took out a patent for his machine; and discovering that it was in use by manufacturers in Lancashire without his permission, brought an action for £7000 damages. Pending the trial he was offered by a company £3000 for the use of the jenny, but refused; and it having been proved that he sold some of his machines before the patent was obtained, it was thereby declared to have been invalidated, and his claim for compensation fell to the ground. Hargreaves

continued to carry on business as a yarn manufacturer, with moderate success, till his death in April, 1778.

HAR'GROVE, Robert Kennon (1829—). An American ecclesiastic, Bishop of the Methodist Episcopal Church, South. He was born in Alabama in 1829, graduated at the State University in 1852, and was professor of mathematics there from 1852 to 1857. He was employed in pastoral work and teaching until 1882, when he was chosen bishop. In 1889 he was elected president of the board of trustees of Vanderbilt University.

HARICOT. See Kidney-Bean.

HARI-KARI, hä'rē kä'rē. See Hara-Kiri.

HÄRING, hä'ring, Wilhelm. A German novelist. See Alexis, Willibald.

HAR'INGTON, Sir John (1561-1612). An English author, born at Kelston, near Bath, in 1561. He was son of John Harington, author of the graceful *Verses on Isabella Markham*. Queen Elizabeth was his godmother. Educated at Eton and at Christ's College, Cambridge, he studied law at Lincoln's Inn; but he soon became attached to the Court. At the command of Elizabeth he translated Ariosto's *Orlando Furioso* (1591). For this easy and free rendering of an Italian classic Harington is best known. In 1596 he lost for a time the favor of the Queen by a series of tracts in the outspoken manner of Rabelais: *Metamorphosis of Ajax* (i.e. 'a jakes'), *Ulysses upon Ajax*, *An Anatomy of Ajax*, and *An Apology*. He served in Ireland under Essex, and was knighted on the field by the Earl, to the great annoyance of Elizabeth. After long striving for preferment under James I., he became at length one of the tutors of Prince Henry, for whom he wrote some shrewd sketches of the bishops of Elizabeth's reign, entitled *A Brief View of the Church of England* (first published 1653). He also composed many popular epigrams (complete ed. 1618). He died November 20, 1612. Consult the memoir by C. Markham, prefixed to *Tract on the Succession*, Roxburghe Club (Edinburgh, 1880); *Nugæ Antiquæ*, miscellanies in verse and prose, ed. H. Harington (London, 1769; reëdited by Park, 1804); and *Metamorphosis*, etc., ed. by Singer (Chiswick, 1814).

HARIRI, hä-rē'rē, Abu Mohammed al-Kasim ibn Ali (c.1054-1122). A celebrated Arabic philologian and poet. He was born at Basra, about 1054, and died there, 1122. Little is known of his life and circumstances save that he was the son of a silk-merchant (whence his name Hariri, from *harir*, silk). Hariri wrote several valuable grammatical works, of which two have been published: *Durrat al-gawwas*, edited by Thorbecke (Leipzig, 1871), and *Molhat al-irab*, edited and translated into French by Pinto (Paris, 1885-89). The most famous of all his writings, and one of the most remarkable compositions of all times and countries, is his book entitled *Makamat*, 'Sittings.' It may be described as a novel, or a collection of fifty rhymed tales, loosely strung together, the centre of which is always a certain Abu Zaid from Seruj, who, witty, clever, amiable, of pleasing manners, well read in sacred and profane lore, but a thorough rogue, turns up under all possible disguises, and in all possible places—sermonizing, poetizing, telling adventures and tales of all kinds—always amusing and always getting money out of his audience. It is witty, imaginative, dramatic, and displays a great command of language. There have been many translations and imitations, of which by far the best is by Rückert, *Verwandlungen des Abu Seid von Serug* (Frankfort, 1826); there are English translations by Chapellon (London, 1767), Preston (ib., 1850), and Chenery (ib., 1867). The text has been edited with notes by De Sacy (Paris, 1882; reëdited by Reinaud and Derenbourg, ib., 1847-53); and by Steingass (London, 1896). Consult Delabre, "Hariri, sa vie et ses écrits," in *Revue Orientale*, 1853.

HARIŚCHANDRA, hä'rish-chän'drä. A Hindu king of the solar dynasty, a descendant of Ikshvaku, and one of the more prominent personages in the legendary history of ancient India. The earliest mention is made of him in the *Āitareya-Brāhmana*, 7, 13-18 (see Veda), where he is the subject of one of the most interesting legends of the Vedic period. He is represented here as desirous of obtaining a son, and of making a compact with the god Varuna, by which he proposed to sacrifice to the god his son, if he were granted one. Varuna accepted his prayer, and a son, Rohita, is born to the King. The *Āitareya-Brāhmana* then proceeds to relate how Hariśchandra delayed, from time to time, the fulfillment of his part of the compact, until at last the son himself finds his own substitute in Śunahśepa, the child of another, who sells his son for 100 cows, to be offered in sacrifice to Varuna. Ultimately, however, Śunahśepa was released from his bondage through the intervention of the gods. The story is important in connection with early accounts of human sacrifices. According to the epic poem *Mahābhārata*, Hariśchandra was a type of munificence and piety, and after death became elevated to the Court of Indra; and some of the Purānas are still more explicit on his fate. Having given his whole country, his wife and son, and finally himself, to Viśvamitra, in satisfaction of the demands made by this priest, Hariśchandra, in consequence of this act, became elevated with his subjects to the paradise of Indra; but, having been misled by Narada to boast of his merits, was again precipitated. The repentance of his pride, however, arrested his downward descent, and he and his train paused in mid-air, where his city is popularly believed to be at times still visible. Consult Wilson's translation of the *Vishnu-Purāna*. The *Mārkaṇḍeya-Purāna*, bks. vii.-viii., translated by Wortham in the *Journal of the Royal Asiatic Society* (London, 1881), is the source of an interesting Sanskrit drama which deals with the text or trial of Hariśchandra. This play, entitled *Caṇḍa-Kāuśika*, is accessible in a cheap and admirable translation, with introduction, by Fritze, published in the Reclam Series (Leipzig, 1894).

HARIVANŚA, hä'rē-vän'shä. A Sanskrit epic composition of some 16,000 couplets, and forming a supplementary book to the *Mahābhārata*, of which it professes to be a part. In many respects, however, it resembles a Purāna (q.v.). As its title, 'Race of Hari, or Vishnu,' implies, it is devoted largely to the life and adventures of Krishna as an incarnation of the god Vishnu. Its first part gives an account of creation, together with the legendary dynasties leading down to its main theme, the life of its hero;

its third or last part treats of the future age and decadence of the world. Some allusions in Sanskrit literature which connect it with the *Mahābhārata* show that it must have been as old as the fifth century A.D., in fact as old as certain portions of the great epic itself, although these are generally regarded as later portions. As a rule the *Harivansa* is not considered by scholars to be a work of great antiquity or value, although often quoted by later Sanskrit writers. There is a French translation by A. Langlois (Paris, 1834); and the best separate edition of the text was published in Bombay (1891).

HARKAVY, här'kä-vī, Avraam (or Albert) (1839—). A Russian Orientalist and Hebrew rabbi, born at Novogrudok in Lithuania, and educated at Vilna and at the University of Saint Petersburg. He studied in Berlin under Rödiger and Dümichen, and in Paris under Oppert, and would have been appointed docent in Saint Petersburg save for a personal enemy. As librarian of the Imperial Public Library of Saint Petersburg, which is especially rich in Semitic manuscripts, he wrote *Studien und Mitteilungen aus der Sankt Petersburger kaiserlichen Bibliothek* (incomplete, 1879-92); and published, in Hebrew, several works on the Jews in Russia (1865 and 1867); in French, *Les mots égyptiens de la Bible* (1870), and *Sur un passage des 'Prairies d'or' de Macoudi concernant l'histoire ancienne des Slaves* (1876); in German, besides the *Studien* already mentioned, contributions to Stade's *Zeitschrift für alttestamentliche Wissenschaft*, a *Katalog der hebräischen Bibelhandschriften der kaiserlichen öffentlichen Bibliothek* (with Strack, 1875); *Altjüdische Denkmäler in der Krim* (1876); *Aus dem archäologischen Congress* (1882); and *Neugefundene hebräische Bibelhandschriften* (1884); and in Russian, works on Mohammedan writers concerning the Slavs and Russians (1870); on the original home of the Semites, Indo-Europeans, and Hamites (1872); and contributed to the Russian edition of Gustav Karpeles's *History of Jewish Literature* (1890). He edited vols. vi. and x. in the Russian edition of Graetz, *History of the Jews* (Leipzig, 1883-1902).

HARK'NESS, Albert (1822—). An American scholar and educator, born at Mendon, Mass. He graduated at Brown in 1842, was senior master of the Providence High School from 1846 to 1853, pursued studies in Germany at the University of Berlin and that of Bonn, and was the first American to obtain a degree from the latter (Ph.D., 1854). In 1855 he was appointed professor of Greek in Brown University. He visited Europe in 1870 and 1883, and there made investigation of educational questions, in particular of the methods of German and English universities. He assisted in founding the American Philological Association, of which he was a first vice-president in 1869-70, and president in 1875-76. As a member of the Archæological Institute of America, he was appointed in 1881 to the committee on the expediency of establishing an American School of Classical Studies at Athens, an institution which was opened in 1882. In 1884 he was elected director of the school. He lectured extensively before learned societies, contributed valuable papers on original researches in philology to the *Transactions* of the Association, and from 1851 published a series of textbooks in Latin studies, of which it may be said that from them dated the beginning of a new era in the Latin department of classical education in America. The volumes include: *First Latin Book* (1851); *Second Latin Book and Reader* (1853); a *Latin Reader* (1865); *Introduction to Latin Composition* (1868, 1888); annotated editions of (1870, 1886) Cæsar's *De Bello Gallico*, of (1873, 1882) select orations of Cicero, and of (1878, 1884) Sallust's *Catilina;* an annotated *Course in Latin Prose Authors* (1878); and a standard *Latin Grammar* (1881), published in a thorough revision with many additions as *A Complete Latin Grammar* (1898). Professor Harkness received the degree of LL.D. from Brown University in 1869.

HARKNESS, William (1837-1903). An American astronomer, born at Ecclefechan, Scotland, a son of James Harkness (1803-78). He was educated at Lafayette College, Rochester University, and in New York City, where he studied medicine. He served as a surgeon in the Union armies during part of the war. From 1862 to 1865 he was an aid in the United States Naval Observatory, and then, after service on the monitor *Monadnock*, was employed in the Hydrographic Office. During the eclipse of August, 1869, he discovered the coronal line *K 1474*. Three years later he was made a member of the Transit of Venus Commission, had charge of the party at Hobart, Tasmania, in 1879, and at Washington in 1882, when he became its executive officer. But his greatest fame rests on his theory of the focal curve of achromatic telescopes and on his invention of the spherometer, caliper, and other astronomical instruments. He was astronomical director of the Naval Observatory (1894-99), and director of the *Nautical Almanac* (1897-99). He retired two days after attaining the relative rank of rear-admiral (December, 1899). He was president in 1893 of the American Association for the Advancement of Science. Of his works, the most important is *The Solar Parallax and Its Related Constants* (1891).

HAR'LAN. A city and the county-seat of Shelby County, Iowa, 45 miles northeast of Council Bluffs; on the West Nishnabotna River, and on the Chicago and Northwestern and the Chicago, Rock Island and Pacific railroads (Map: Iowa, B 3). It is the commercial centre for a farming section, and manufactures gas and gasoline engines, foundry products, agricultural implements, bricks, flour, etc. Population, in 1890, 1765; in 1900, 2422.

HARLAN, James (1820-99). An American lawyer and legislator, born in Clarke County, Ill. He graduated at Indiana Asbury (now De Pauw) University in 1845, studied law, and, removing to Iowa, became State Superintendent of Public Instruction in 1847. In 1850 he was tendered the Whig nomination for Governor, but refused it on account of being under the required age. In 1853 he was chosen president of Iowa Wesleyan University. Two years later he was elected to the United States Senate, but after he had served until January, 1857, his seat was declared vacant on a technicality. He was immediately reëlected by the Iowa Legislature, however, and was again reëlected on the expiration of his original term in 1861. His recognized ability as a legislator attracted the attention of President Lincoln, who in 1865 appointed him Secre-

tary of the Interior. In 1866 he resigned from the Cabinet to reënter the Senate, to which he had been reëlected for a third term, and he continued as one of the Republican leaders in that body until 1872, when he was defeated for reëlection by William B. Allison. From 1882 to 1885 he was presiding judge of the Court of Commissioners of Alabama Claims at Washington.

HARLAN, JOHN MARSHALL (1833—). An American jurist, born in Boyle County, Ky. He graduated at Centre College in 1850, and at the law department of Transylvania University in 1853; practiced his profession for a time at Frankfort, and became judge of Franklin County in 1858. From 1861 to 1863 he served in the Federal Army as colonel of the Tenth Kentucky Infantry, and from 1863 to 1867 was Attorney-General of Kentucky. He was a Republican candidate for Congress in 1871 and 1875, but was each time defeated, and in 1877 was appointed by President Hayes a member of the Louisiana Commission, which was formed to inquire into and so far as possible remove the obstacles to regular procedures under the laws and Constitution of the State, so that a single Legislature might come to be recognized, and the Government be maintained with armed resistance. In November, 1877, he was appointed an associate justice of the United States Supreme Court, where his conduct was marked by legal capability and intellectual vigor. When the constitutionality of the Wilson Tariff Act of 1894, providing for an income tax, was questioned, and a test case was brought before the Supreme Court, he was one of the four justices who upheld the validity of the instrument.

HAR'LAND, HENRY (1861—). An American novelist, born at Saint Petersburg, Russia, March, 1861. He was educated at the College of the City of New York and at Harvard, and, after traveling in Europe as a correspondent and serving for a time in the Surrogate's Office in New York City, removed to London, where, among other labors, he edited *The Yellow Book*. Among his novels may be named *As It Was Written* (1885); *Mrs. Peixada* (1886); *The Land of Love* (1887); *The Cage of the Thora* (1887); *My Uncle Florimond* (1888); *Mr. Sonnenschein's Inheritance* (1888); *A Latin Quarter Courtship* (1889). Later he produced *Mea Culpa* (1893), and won deserved success with *The Cardinal's Snuffbox* (1900) and *The Lady Paramount* (1902). His earlier novels, which dealt with American Jewish life, were written under the name of 'Sidney Luska.'

HARLAND, MARION. The pseudonym of the American novelist Mary Virginia Hawes Terhune (q.v.).

HAR'LAW. A locality in Scotland, about 18 miles northwest of Aberdeen, noted as the scene of a battle fought July 24, 1411, between the Highlanders under Donald, Lord of the Isles, and the forces of the Lowlands under Alexander Stewart, Earl of Mar. The Highlanders were defeated with the loss of nearly 1000 men. The battle of Harlaw passed into legend as one of the most desperate attempts on the part of the Celtic tribes of Scotland to stem the tide of Anglo-Norman invasion.

HARLAY DE SANCY, de säN'sē', NICOLAS. See SANCY, NICOLAS DE HARLAY DE.

HARLEIAN (här-lē'an) **COLLECTION.** A valuable collection of manuscripts in the British Museum (q.v.), consisting of 7639 volumes and 14,236 original rolls, charters, deeds, and other legal documents. The collection, made by Robert Harley, first Earl of Oxford (1661-1724), and by his son, Edward Harley (1689-1741), was purchased by the English Government from Lady Oxford in 1753 for £10,000, and deposited in the British Museum. The collection is indexed. Consult *Life and Times of Robert Harley, Earl of Oxford* (New York, 1902).

HAR'LEM. A town in the Netherlands. See HAARLEM.

HARLEM. A village in Cook County, Ill., nine miles from the Chicago court-house; on the Chicago and Northwestern, the Illinois Central, and other railroads. It is mainly a residential suburb of Chicago, and has the well-known Harlem race-track. There are several cemeteries here, among them Forest Home and Waldheim cemeteries, the latter of note as the site of a monument to the anarchists who were executed for complicity in the riots of 1886. (See CHICAGO.) Settled in 1854, Harlem was incorporated in 1883. It is governed by a president, annually elected, and a board of trustees, chosen on a general ticket. The water-works and electric-light plant are owned and operated by the municipality. Population, in 1900, 4085.

HARLEM. A local name for that part of New York City above 106th Street between the East and Harlem rivers and Eighth Avenue. Originally a separate settlement, for many years it was a quaint Dutch village, mainly of private residences surrounded by gardens and farms. It was noted for abundance of shade-trees, and the sleepy quietness so quaintly described by Washington Irving in the *Knickerbocker's History of New York*. The designation is often applied, in a loose sense, to the entire northern portion of the city.

HARLEM RIVER. A tidal channel about 500 feet wide, separating Manhattan Island, New York City, from the mainland, and extending from the Hudson at Spuyten Duyvil Creek seven miles southeast to the East River at Randall's Island (Map: Greater New York, D 4). A short ship-canal across the northern end of Manhattan Island, between the Hudson and the Harlem, was opened in 1895. The Harlem is spanned by a number of bridges, the finest being Washington Bridge and High Bridge, the latter an aqueduct bridge. A magnificent roadway, known as the Speedway, has been constructed along the western shore of the Harlem. On a lofty eminence on the opposite shore are the beautiful buildings of New York University.

HARLEQUIN (OF. *harlequin*, Fr. *arlequin*, Ital. *arlecchino*, from OF. *herlequin*, *herlekin*, *hellequin*, *hellekin*, demon, from the Germanic; cf. AS. *helle cynn*, folk of hell; scarcely from It. *il lechino*, plate-licker, in allusion to the gluttony of the primitive Harlequin). One of the most noted of the conventional personages in pantomime (q.v.). The character developed in the early popular comedies of Italy (*commedia dell' arte*). Attempts to trace him back to the Roman *Atellanæ* and the mimic *Sannio*, through the Italian word *zanni*, are inconclusive. When the persons in the extempore comedy represented local types, Harlequin stood for Bergamo, just as did his brother *zanni*, Scapino, commonly for

Naples, and Pantalone, the old man whom Arlecchino served, for Venice, while 'the Doctor,' Scapino's master, was supposed to be a pedant from Bologna. Harlequin is a suitor of Columbine, and gets her away from poor Pedrolino (the French *Pierrot*). Though full of amusing blunders, Harlequin combines his childlike capers with a good deal of mature *finesse*. He is represented with a tight suit of parti-colored patches, a black mask, and a wooden sword. When he was introduced into France in the sixteenth century, the witty side of his character was more fully developed, and he was speedily adopted by other nations. Famous among the Harlequins of France in the seventeenth and eighteenth centuries were Domenico Biancolelli, called from Vienna to Paris by Mazarin about 1660; Vizentini, known as Thomassin and Bertinazzi, called Carlin, who won the admiration of Garrick. The first English Harlequin is said to have been Joe Haines, in 1667. During the eighteenth century, when pantomime became so popular at Drury Lane in Rich's time, Harlequin's name was attached to numerous pieces, such as *Harlequin Dr. Faustus* (1723), and *Harlequin, a Sorcerer*, a little later. Two other noted English Harlequins were Joseph Grimaldi (q.v.), and Tom Ellar, who died in 1842. The modern Christmas pantomime preserves the elements of the legendary plot, the lovers Harlequin and Columbine being favored by fairy interference in despite of their persecutors, Clown and Pantaloon. The word harlequin has come to be commonly used, however, in a general sense almost synonymous with clown.

Consult: Moeser, *Harlekin oder Vertheidigung des Grotesk-Komischen* (Leipzig, 1771; trans. by Warnecke, London, 1766); Reynaud, *Quelques mots sur Arlequin*, etc., in *Etudes romanes dédiées à Gaston Paris* (Paris, 1891); Broadbent, *A History of Pantomime* (London, 1901).

HARLEQUIN CABBAGE-BUG, or CALICO-BACK. A bug (*Murgantia histrionica*) noted as a very destructive enemy to cruciferous vegetables in the Southern United States. It is an oval, somewhat flattened black bug with bright red and yellow markings, whence the names 'harlequin' and 'calico.' It lives throughout the year on cabbage, radish, mustard, and other cruciferous plants, puncturing the leaves with its beak and causing them to wither and dry. The eggs, which resemble miniature white barrels with black hoops, are laid in a double row on the under side of the leaves. There are several generations in a year, and the adult bugs hibernate. It is the worst enemy of the Southern cabbage-growers on account of the difficulty of destroying it. Mixtures made strong enough to kill the bugs kill the plants also. The best method is to plant an early trap-strip of mustard, upon which the over-wintering bugs will cluster in the spring, and upon which they may be killed with pure kerosene. This is originally a Central American insect, and has been spreading toward the northeast for 40 years or more. It is now found in southern New Jersey and in most of the intervening territory southwest to the Rio Grande.

HARLEQUIN DUCK. A name given, in allusion to its variegated colors, to a rare duck (*Histrionicus histrionicus*) inhabiting the polar regions, and occasionally seen in Northern Europe and Canada. It is a near relative of the now extinct Labrador duck. Several other sorts of birds have been called 'harlequins' because of their quaintly contrasted colors.

HARLEQUIN-SNAKE (so called from the coloring). The small red and black venomous coral-snake (*Elaps fulvius*) of Florida, also called 'candy-stick.' See CORAL-SNAKE.

HARLESS, bär'lĕs, GOTTLIEB CHRISTOPH ADOLF (1806-79). A German Protestant theologian, born in Nuremberg. He studied theology at Halle and Erlangen, and became professor of theology at the latter institution. For his opposition in the Bavarian Diet of 1842 to the order requiring persons in the army to kneel at the passing of the sacramental host, he was removed from his professorship. In 1845, however, he was chosen to the consistory of Bayreuth, professor of theology at Leipzig, and Court preacher. In 1852 he was made president of the Protestant Consistory of Munich. Among his many important works are: *Theologische Encyklopädie und Methodologie* (1837); and *Die christliche Ethik* (1842; English trans. 1868). His autobiography, entitled *Bruchstücke aus dem Leben eines süddeutschen Theologen*, was published in 1872.

HARLETH, GWENDOLEN. The heroine of George Eliot's *Daniel Deronda*.

HARLEY. The hero of Henry Mackenzie's *Man of Feeling*.

HARLEY, Sir EDWARD (1624-1700). An English Parliamentarian, born in Brampton-Bryan, Herefordshire. Educated at Shrewsbury, Gloucester, and Oxford, he studied law, but took up arms in the Parliamentary cause against the King in 1642, though disapproving of military supremacy in the nation. By 1646 he was a member of Parliament for his native county, but his opposition to Cromwell brought about his banishment from it for ten years, though he was rewarded at the Restoration by Charles II., who made him Governor of Dunkirk (1660). Despite his changes of front (for he was against the Stuarts once more at the Revolution of 1688), Harley was a conscientious upholder of the rights of the people, who showed their appreciation by sending him continuously to Parliament. Though a churchman himself, he fought against any form of persecution of the dissenters, was without party prejudice, and was remembered more for his practical benefactions than for such theoretical performances as *A Scriptural and Rational Account of the Christian Religion* (1695).

HARLEY, ROBERT, Earl of Oxford and Mortimer (1661-1724). An English statesman. The son of Sir Edward Harley, he belonged to an illustrious Herefordshire family. The father had been a military officer, a member of Parliament, and an opponent of Cromwell during the Civil War. Robert, elected to Parliament for the borough of Tregony, was at first a Whig, but gradually changed his politics till he became leader of the Tory and Church party. His cleverness and tact, however, retained for him the support of many Whigs and Dissenters. He shortly acquired a great reputation for his knowledge of Parliamentary law and practice, a study not much pursued in those days; and in the Parliament which met under the chieftainship of Rochester and Godolphin in February, 1701, he was elected Speaker by a large majority.

Harley retained his post, having been twice re-elected, till 1705. In 1704 he became a member of the Privy Council and Secretary of State. Assisted by his cousin, Abigail Hill—afterwards Lady Masham—he excited Queen Anne against her Whig ministers, Marlborough and Godolphin, who in turn plotted against him. By convicting Harley's secretary of treasonable correspondence with France, they caused Harley himself, though entirely exculpated, to resign his office in February, 1708. Harley, on his part, by persistently working on the Queen through Lady Masham during his two years of retirement, finally brought about the overthrow of the Whigs. In August, 1710, Godolphin was dismissed, and Harley, appointed to the post of Chancellor of the Exchequer, brought back the Tories. An event occurred in 1711 which raised him to the acme of popularity. A French priest and spy, who assumed the title of Marquis de Guischard, when brought before the Council on March 8th, on the charge of treasonable correspondence with the French, rushed upon Harley, and stabbed him with a penknife. He fell dangerously ill from the wound; and when he recovered he was congratulated by Parliament on his escape, created Earl of Oxford and Mortimer, decorated with the Garter, and in the following May appointed Lord High Treasurer of Great Britain. From this point Harley's course was downward; he was not a man of business, and was destitute of decision of character. He was an astute political leader, but lacked sincerity, breadth of view, and, in brief, all other noble qualifications. The principal act of his administration was the Treaty of Utrecht. Harley ceased to pay court to Lady Masham, and Bolingbroke succeeded in getting him dismissed on July 27, 1714. Lord Oxford retired on Tuesday; Bolingbroke became Premier; and the Queen died on Sunday. George I. was proclaimed, and the period of Tory ascendency came to an abrupt end. The conduct of both the Tory leaders in their relations with the Stuarts had been such as to render their impeachment possible as well as probable. In March, 1715, Bolingbroke fled to France, but Oxford remained to meet his fate. He was sent to the Tower, and after two years' imprisonment brought to trial on a charge of treason. The two Houses quarreled about the mode of procedure, and as the Commons in anger refused to take any part in the trial, he was acquitted by the Peers and released. He spent the remainder of his life in retirement. He was the founder of a collection of books and MSS., which perpetuates his name. Consult: Burnet, *History of His Own Times* (6 vols., London, 1838); Macaulay, *History of England* (London, 1855); Stanhope, *History of England, Comprising the Reign of Queen Anne Until the Peace of Utrecht* (London, 1870); Lecky, *History of England in the Eighteenth Century* (London, 1878-90); Manning, *Speakers of the House of Commons* (London, 1851); Lodge, *Portraits of Illustrious Personages of Great Britain* (London, 1850); Howell, *State Trials* (London, 1809-26); Boyer, *Political State of Great Britain* (London, 1724); Roscoe, *Robert Harley, Earl of Oxford, Prime Minister 1710-14* (London, 1902).

HARLEZ, är'lā', Charles de (1832-99). A Belgian Orientalist who attained to special eminence in the fields of Iranian and Chinese philology. He was born at Liège, and was educated at the university there, and afterwards took clerical orders, and rose to be a distinguished prelate in the Catholic Church, with the title of monsignor. His interest in the Orient early attracted him to the study of Sanskrit and Avestan; and in 1867 he became actively engaged in teaching these studies at the University of Louvain. His translation of the Avesta, *Livre sacré des sectateurs de Zoroastre* (1875-77; 2d ed. 1881), still holds a high rank among scholars. It was followed by a series of other studies in Zoroastrianism: *Etudes avestiques* (1878); *Des origines du Zoroastrisme* (1879); *L'exégèse des textes avestiques* (1883); and several grammars or manuals for the study of Sanskrit (1878; 2d ed. 1885); Avesta (1879; 2d ed. 1882); Pahlavi (1880), including one also on Manchu (1884).

About 1884, in connection with his researches into the language of Manchuria, he began to turn from Persia and India to China, and he devoted the remainder of his life to investigations connected with the literature, language, and life of China herself. A long series of monographs or volumes from his pen on the subject of Chinese was the result. These are to be found published in the Annals of the Musée Guimet, of Paris, and in the Memoirs of the Royal Academy of Belgium. In 1896 a large number of his pupils and friends issued a volume in honor of this distinguished scholar; it bears the title *Recueil de travaux d'érudition offert à Mgr. Charles de Harlez* (Leyden, 1896). The breadth of Harlez's studies and interest is shown likewise by his acquaintance with several of the American languages and also with Magyar literature.

HARLINGEN, här'ling-en (Frisian *Harns*). A seaport of the Netherlands, in the Province of Friesland, situated on the Zuyder Zee, 16 miles west of Leeuwarden, with which it is connected by rail and canal, about 65 miles north-northeast of Amsterdam (Map: Netherlands, D 1). The town is cut up by canals and is built on the site of a city which was swept away by an inundation in 1134. It has a school of navigation. Harlingen carries on an active trade with England and Norway, exporting the agricultural products of the Province of Friesland, and is connected by steamship lines with Amsterdam, Hull, and London. The harbor is an excellent one, reconstructed in 1870-77, and protected by enormous dikes. Population, in 1890, 10,110; in 1900, 10,267.

HARLOT'S PROGRESS, The. A group of six paintings by Hogarth, representing the history of a fallen woman, from her first false step to her tragic end. They were completed late in 1731. Five of the paintings were burned at Fonthill in 1755; the remaining one is now at Gosford House, in the possession of the Earl of Wemyss.

HAR'LOW, George Henry (1787-1819). An English artist, born and educated in London. He was instructed by Henry De Cort, the landscape painter, Samuel Drummond, a portrait painter, and by Sir Thomas Lawrence. As the result of a quarrel with Lawrence he began to work out his own theories in defiance of academical rules. He had remarkable power of close and rapid observation, and soon had a number of portraits on exhibition at the Royal Academy, although he outspokenly opposed that institution. He

was less successful in historical painting, though several of his pictures of this kind showed strong points. In 1818 he visited Italy to study the old masters, and was very cordially received in Rome, where he worked assiduously, and made great progress. Soon after his return to England in 1819 he was seized with an acute throat affection which caused his death in less than a month. Harlow was an artist of great promise, who died before the full development of his powers. His works, notwithstanding defects of judgment and immaturity, have vital qualities of excellence. Among them are a group of portraits of Charles Mathews, the actor; "Queen Elizabeth Striking the Earl of Essex," "The Earl of Bolingbroke Entering London," "The Trial of Queen Catherine," and "Wolsey Receiving the Cardinal's Hat in Westminster Abbey."

HAR'LOWE, CLARISSA. The heroine of Richardson's *History of Clarissa Harlowe.* To escape a distasteful marriage she puts herself under the protection of a lover, who proves unworthy of her confidence. He offers to marry her to atone for his crime, but she refuses, and dies of shame broken-hearted.

HARMACHIS, här'mâ-kĭs (Egyptian *Hormtakh,* Horus in the two horizons). An Egyptian god, a manifestation of Horus (q.v.). According to certain inscriptions, the gigantic Sphinx (q.v.) near the pyramids of Gizeh, perhaps a work of Chephren (q.v.), represented this god, but he is usually represented in the form of a hawk.

HAR'MALIN AND HAR'MIN (from Neo-Lat. *harmala,* from Ar. *harmal,* Syrian rue). Two vegetable bases occurring in the husk of the seeds of the *Peganum harmala,* or Syrian rue, a plant that grows abundantly in the steppes of Southern Russia. *Harmalin,* $C_{13}H_{14}N_2O$, when pure, crystallizes in colorless prisms. *Harmin,* $C_{13}H_{12}N_2O$, crystallizes in delicate prisms. The red coloring matter known in commerce as *harmala red* is obtained from the seeds of the same plant. The *Peganum harmala* belongs to the natural order Zygophyllaceæ. It is a half-shrubby plant, with smooth linear pinnate or bipinnate leaves, and solitary white flowers. The seeds are used by the Turks as a spice.

HAR'MAR, JOSIAH (1753-1813). An American soldier, born in Philadelphia, Pa., and educated at the Quaker School of Robert Proud. At the outbreak of the Revolutionary War he entered the patriot army as captain in a Pennsylvania regiment. He became its colonel in 1777, was promoted in 1783 to be brevet colonel in the first United States regiment, became brevet brigadier-general in 1787, and on September 29, 1789, was made commander-in-chief of the United States Army. In order to punish the Indian tribes of the Northwest, who had been incited to hostilities by British agents, an expedition under the command of Harmar was sent out from Fort Washington, on the site of the present Cincinnati, in 1790. He inflicted considerable damage in desolating the country through which he passed; but in a battle with the Miamis, fought in September of that year, the main body of troops was left unsupported in consequence of an advance sortie of the cavalry and some militia, and after a severe defeat the expedition returned to Fort Washington. Harmar resigned his commission in 1792, and from 1793 till 1799 was adjutant-general of Pennsylvania.

HARMAT'TAN (through the Arabic; probably from the native name). A very dry wind along the west coast of Northern Africa from the Gulf of Guinea to Senegambia. This wind blows from the interior of Northern Africa or the Desert of Sahara southward and westward, and is felt over the Atlantic Ocean to a considerable distance from the coast. It prevails especially during December, January, and February, with occasional occurrences in November and March. On the Gold Coast it blows from the northeast in the night-time, but from the southeast at mid-day. During its prevalence the sky is cloudless and the regular diurnal variations of temperature are large; the morning minimum temperatures are lower and the mid-day maximum temperatures slightly higher; the relative humidity is from 25 to 50 per cent. below the normal, and this dryness produces rapid evaporation and a profound sensation of coldness. The barometric pressure is slightly higher during the first part of the Harmattan, and the wind, when once started, lasts for several days, or in extreme cases for several weeks. Vegetation is dried up very much as in the case of the dry winds of California and the plains on the eastern slope of the Rocky Mountains. The natives, being thinly clad, can prevent the skin from cracking and keep it soft and pliable only by anointing the body with oils or fats.

A peculiar whitish haze usually accompanies the Harmattan; this is due to the presence of an immense number of fragments of the microscopic shells of diatoms, together with other foreign matter floating in the air. As seen through this haze the sun and moon have a reddish tint. This diatomaceous dust is undoubtedly brought by the wind from the interior, possibly from the desert itself. The Harmattan wind is usually cool and dry, but in a few localities it is warm and dry. Everything points to the fact that it is a descending wind blowing out from under the great area of moderately high pressure that prevails over the Sudan, and toward an area of moderately low pressure temporarily prevailing over the equatorial part of the Atlantic Ocean. This wind blowing from the Sudan northward toward Europe becomes the Sirocco of Italy. The same wind blowing over the desert itself and carrying great clouds of sand gives rise to the Simoom. The cool, dry, cloudless weather and hazy horizon that prevail occasionally in the eastern portion of the United States, and especially in the dry months of California, are analogous to the African Harmattan.

HARMENOPULOS, här'mĕn-ŏp'ụ-lŏs, KONSTANTINOS (c.1320-c.1380). A Byzantine jurist, an Imperial counselor under Kantakuzenos and John Palæologus and later a judge in Thessalonica. His *Promptuarium Iuris* (edited by Heimbach, 1851) had much use through the Middle Ages and has a certain value still. Consult Dirksen, *Das Rechtsbuch des Harmenopulos* (1847).

HARMO'DIUS AND **AR'ISTOGI'TON** (Lat., from Gk. *Ἁρμόδιος, Ἀριστογείτων*). Two Athenian citizens, of the family of the Gephyræi. Harmodius was a beautiful youth who ardently loved his relative Aristogiton. Hipparchus, son of the tyrant Pisistratus, endeavored to separate the two friends and to secure the friendship of

Harmodius for himself, but, not succeeding, avenged himself by insulting publicly the sister of Harmodius. Thereupon the two laid a plot to slay both Hipparchus and his brother Hippias on the day of the great Panathenaic festival, B.C. 514. The plot miscarried by reason of a premature attack being made. Hipparchus was slain, but Harmodius was at once overpowered by the guards. Aristogiton fled, but was afterwards taken and executed; though put to the torture, he did not disclose the names of the real conspirators. Hippias was afterwards expelled (B.C. 510), and then and in all later times Harmodius and Aristogiton were honored as martyrs who had fallen in the cause of liberty. Their praises were sung in drinking songs, and they received almost divine honors. Two bronze statues, made by Antenor, were set up in their honor on the Agora; these were carried away by Xerxes at the time of the Persian War, but were afterwards brought back by Alexander the Great. Other statues by Critius and Nesiotes, however, in 477 replaced those carried away by the Persian king. The descendants of Harmodius and Aristogiton enjoyed freedom from taxation and from all public duties. Consult: Harrison and Verrall, *Mythologies and Monuments of Ancient Athens* (New York, 1890); p. 77 ff.; Frazer, *Pausanias* (Cambridge, 1898), vol. ii., p. 92 ff.; and the better histories of Greece and of Greek sculpture.

HAR'MON, JOHN. The hero of Dickens's *Our Mutual Friend,* who, under the respective aliases of Julius Handford and John Rokesmith, returns to England, escapes a charge of murder, and watches the use which his deceased father's steward makes of his inheritance until his disguise is accidentally discovered. He eventually marries Bella Wilfer.

HARMON, JUDSON (1846—). An American lawyer. He was born at Newtown, Ohio, and graduated at Denison University in 1866, and at the Cincinnati Law School in 1869. He was originally a member of the Republican Party, but left it in the Greeley-Grant campaign. In 1878 he was elected to the Superior Court of Cincinnati; but nine years later he returned to active practice, from which, in 1895, he was called to succeed Richard Olney as Attorney-General in President Cleveland's second Cabinet. In 1897, immediately after his retirement from the Cabinet, he was elected president of the Ohio Bar Association. Soon afterwards he became a lecturer on agency in the law department of the University of Cincinnati.

HARMO'NIA (Lat., from Gk. Ἁρμονία, from ἁρμός, *harmos,* joint, from ἀρεῖν, *arein,* to be about to join). In the Theban legend, the daughter of Ares and Aphrodite, and wife of Cadmus (q.v.), who received her after slaying the dragon. The wedding was attended by all the gods, and in the Theban cycle seems to have occupied as prominent a place as that of Peleus and Thetis in the tale of Troy. Among the gifts were a mantle and necklace, which played a large part in the later legend as bringing ruin to their possessors; with the necklace Polynices bribed Eriphyle to betray her husband, Amphiaraus (q.v.), to his death. When Cadmus was introduced into the Samothracian mysteries, Harmonia became the daughter of Zeus and Electra, and sister of Dardanus and Iasion, and the marriage was celebrated at Samothrace. Another version told how Cadmus carried off Harmonia, who was sought during the mysteries, as Core at Eleusis. Harmonia seems originally to have been a goddess of love and the harmonizing power of nature. Different in origin is the Attic Harmonia, who joins in the chorus of Muses and Graces, as companion of Aphrodite, and even becomes mother of the Muses in Euripides. There she is simply a personification of order and harmony.

HARMON'ICA (Neo-Lat. nom. sg. fem., from Lat. *harmonicus,* Gk. ἁρμονικός, *harmonikos,* harmonious, musical, from ἁρμονία, *harmonia,* harmony). A musical instrument, invented by Benjamin Franklin. The instrument consisted of a series of glasses, each one in the shape of a cup, or half-globe, being put into a revolving motion on its centre, while the moistened rim was touched by the finger. Franklin, in a letter dated July 13, 1762, to Padre Beccaria, at Turin, mentions the history of his invention. An Irishman named Puckeridge was the first to hit on the idea of playing airs on a row of glasses, which he tuned by putting water into each. He performed publicly in London; but he and his glasses were burned in a conflagration in London in 1750. When Franklin finished his invention he found an excellent performer in a Miss Davis, to whom he made a present of his harmonica. Miss Davis, in 1765, performed on the harmonica in Paris, Vienna, and all the large cities of Germany with great effect. The compass of its notes was from C to F, including all the chromatic semitones. All attempts to make the harmonica, through means of keys, easier for amateurs, ended in failure, as no substance was found to act as a substitute for the human finger, which doubtless imparted an expression to the sound which no dead substance could possess.

HARMONIC CURVE. A curve formed by the vibration of a musical string. The curve of sines (q.v.) is a simple harmonic curve. The name harmonic was used in this connection by the Greek geometers in investigating the theory of music.

HARMONIC DIVISION. In geometry, a line-segment AB is said to be *harmonically divided* when two points are taken, one in the segment and the other on the segment produced, as C and D, such that

$$AC : CB = AD : DB.$$

Four quantities, a, b, c, d, are said to be in *harmonic proportion* when their reciprocals $\frac{1}{a}, \frac{1}{b}, \frac{1}{c}, \frac{1}{d}$ are so related that $\frac{1}{b} - \frac{1}{a} = \frac{1}{d} - \frac{1}{c}$. The 'harmonic mean' of two numbers, a, b, is $\frac{2ab}{a+b}$. It is the reciprocal of the arithmetic mean of the reciprocals of the two numbers.

HARMONICON (Neo-Lat., from Gk. ἁρμονικόν, *harmonikon,* neu. of ἁρμονικός, *harmonikos,* harmonious, musical), CHEMICAL. An apparatus consisting of an open glass tube, the air in which may be made to give a sound resembling a musical note when it is held over a jet of burning hydrogen. The sounds produced arise

from the successive explosions formed by the periodic combinations of the oxygen in the air with the hydrogen. The note depends on the size of the flame and the length of the tube, and with a long tube, by varying the position of the jet in the tube, a series of notes may be produced. This phenomenon, which was discovered by Lampadius, has been investigated by Tyndall and described in his *Lectures on Sound*. Before the jet is lighted, in an actual experiment, the formation of hydrogen must be allowed to go on until the air is completely driven out of the generating bottle; otherwise a dangerous explosion may take place.

HARMONIC PROGRESSION. See SERIES.

HARMONIC PROPORTION. See HARMONIC DIVISION.

HARMONICS (from Lat. *harmonicus*, harmonious, musical). The accessory or concomitant tones produced by any fundamental tone. When a string tuned to C, for instance, is set in motion, it produces not only that one note, but a number of other tones less intense. These secondary tones are so much weaker than the fundamental that it requires even the closest attention of a fine ear to detect their presence. Mersenne, a Franciscan monk who died in Paris in 1648, was the first who discovered this. But it was not until 1701 that Sauveur gave a scientific explanation. Rameau availed himself of Sauveur's investigations, and founded his new system of harmony upon that basis. When the string C vibrates, it swings not only in its entire length, but at the same time smaller oscillations are produced by the two halves, the three thirds, the four fourths, etc., of the string. Tones can be distinguished for every division of such a string up to one-sixteenth. The two halves vibrating produce each the octave; the three thirds each the fifth above the octave; the four fourths each the fourth above the fifth, etc., of the fundamental tone. This is illustrated by the following table (1 denoting the entire length of the string, 2 one-half, 3 one-third, etc.):

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
						x				x		x	x	x	
C,	c,	g,	c^1,	e^1,	g^1,	$b\flat^1$,	c^2,	d^2,	e^2,	$f\sharp^2$,	g^2,	$a\flat^2$,	$b\flat^2$,	b^2,	c^3.

The tones marked × are only approximately correct. The eleventh tone, for instance, is neither *f* natural nor *f* sharp, but one between these, and nearer to the latter than the former. As all these tones lie above the fundamental, they are called *overtones;* because they are produced by vibrations of only a part of the string, they are also called *partial tones*, or *aliquot tones*. The name *harmonic tones* is given to them because all the tones that are given in their true pitch, except the ninth (d^2), are elements of the fundamental triad (C, E, G). The intensity of the harmonic tones decreases in inverse ratio to their pitch. The lowest tone, C, is called the *generator*. It will easily be seen how from these overtones the consonance of the major triad is established, for each of the elements occurs more than once in the series. F♯, A♭, B♭, and B are not given in their true pitch, and D occurs only once in the whole series.

Taking a high tone, c^3, for instance, a series of tones lying below, and bearing the same relation to the highest tone as the overtones to the fundamental or generator, is produced. These tones are called *undertones* or *lower partials*. The following table illustrates this (notes produced only with approximate correctness being again marked ×):

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
						x				x		x	x	x	
c^3,	c^2,	f^2,	c^1,	$a\flat$,	f,	d,	c,	$B\flat$,	$A\flat$,	$G\flat$,	F,	$E\flat$,	D,	$D\flat$,	C.

In this series D♭, D, E♭, and G♭ are not given in true pitch, and B♭ occurs only once. F, A♭, C occur each more than once. They are the elements of the F minor triad; hence the consonance of the minor triad is established by the series of *undertones* in the same manner as the consonance of the major triad is established by the series of *overtones*. From the consonance of these *chords* the consonance of *intervals* is also determined, for all intervals found in these chords or their inversions are regarded as consonant. The second inversion of either the major or minor triad—i.e. with the fifth as the bass tone (see INVERSION)—yields the intervals of the fourth and major and minor sixth respectively. The only intervals not derivable from the above two series are the second and seventh, which are, therefore, regarded as dissonant, as well as any chord into the formation of which they enter. See INTERVAL.

What has been said about the vibrations of a string applies equally to the vibrations of a column of air. On any stringed instrument harmonics can be produced by lightly touching with the finger-tip any nodal point of the string. (See NODE.) The string then cannot vibrate in its entire length, but only in sections, the length of which is determined by the length of that part of the string lying between the neck of the instrument and the nodal point touched by the finger. For instance, if the lowest string of the violoncello (C) is lightly touched at the middle point between the neck and the bridge, the two sections will vibrate independently, and each half will produce the octave above the tone to which the string is tuned. Thus, instead of C, its next higher octave, *c*, will be heard. Touching the string at one-third of the distance between the neck and the bridge, it will vibrate in three independent sections, each producing the twelfth (or fifth above the octave) of the fundamental note. All the partial tones given in the above table can thus be produced by touching a point at one-fourth, one-fifth, etc., the length of the string. Tones thus obtained from an open string are called *natural harmonics*. Harmonics can also by obtained by first stopping a string, i.e. pressing it firmly to the finger-board, by one finger and touching it lightly with another finger at some nodal point between the pressed-down finger and the bridge. Tones produced in this manner are called *artificial harmonics*. Harmonics are distinguished from tones produced in the ordinary manner by a peculiarly sweet and ethereal quality. The opening bars of the prelude to *Lohengrin* are a splendid example of the effect produced by harmonics. In musical notation harmonic tones are indicated by a ° placed over the note, or by open square notes □. On wind instruments (both brass and wood) harmonic tones are produced by varying the intensity and direction of the air-current. The pressing down of a valve has the same effect as the pressing down of a finger on a stringed instrument. Consult Hauptmann. *Die Natur der Harmonik und der Metrik* (Leipzig, 1853).

HARMONIC STOP. An organ-stop, having pipes double the usual length, and pierced midway, so that the tone produced is an octave higher than the ordinary pitch. Harmonic stops are composed generally of more than a single rank of pipes, tuned in octaves, double octaves, and double or triple thirds and fifths above the natural pitch of the keys; they comprise the mixture, furniture, cornet, etc. Those which have only a single rank of pipes tuned in thirds, fifths, with their octaves above the pitch represented on the keyboard, are called 'mutation stops.' They were introduced to give additional power to the 'foundation stops,' and also to produce a more brilliant effect in the performance of certain styles of music. See ORGAN.

HARMONIOUS BLACKSMITH, THE. An old tune to which Handel wrote variations, and the composition of which, after his death, was ascribed to him. The composer of the original is unknown.

HARMONISTS. A communistic society, founded by George Rapp, who was born in Iptingen, Württemberg, in 1757. He became convinced that the churches around him were not truly representative of Christ's teachings, and in 1787 began preaching a higher spiritual life. Although Rapp and his followers demeaned themselves as peaceable and law-abiding subjects, they excited jealousy and opprobrium, suffered persecution, and were fined and imprisoned. In 1803 they determined to emigrate to America, where a tract of 5000 acres of land was bought in Butler County, Pa., in the valley of the Connoquenessing. Here the Harmony Society was formally organized, February 13, 1805, and its constitution was adopted, in signing which all the members agreed to throw all their possessions into a common stock, to live and dress simply, to hold all things in common, and to labor for the good of the whole body. In the spring of 1805 the community numbered about 125 families, or not quite 750 persons. In 1807 the society was stirred by a profound religious awakening. The members became convinced that it was their duty to give up marriage and adopt the principle of celibacy as being the higher and holier estate. But no marked formalities of separation were instituted. Those who had been husband and wife continued to occupy the same house, with their children, but thereafter treated each other simply as 'brother and sister in Christ.' At the same time the use of tobacco was given up. Although the settlement on the Connoquenessing prospered, the location in a few years proved unsuitable to the needs of the community, and in 1814 a new tract of 30,000 acres was bought in Posey County, Ind., at the site of the present town of New Harmony (q.v.), to which the Harmonists removed during the ensuing twelve months. At this place they increased and prospered, their enterprises flourished, and their membership rose to about one thousand souls; but they became again dissatisfied on account of unhealthy and other unfavorable local conditions. They sold their property to Robert Dale Owen (q.v.), and removed in 1825 to what became their permanent home in Beaver County, Pa. Here they built the village of Economy, on the Ohio River, about 20 miles north of Pittsburg, a place long celebrated as an example of neatness and industrial thrift. The community has suffered one serious division: In 1832 250 members, having become alienated under the influence of a German adventurer, Bernhard Müller, who called himself the Count de Leon, determined to withdraw, and a separation and apportionment of property were agreed upon.

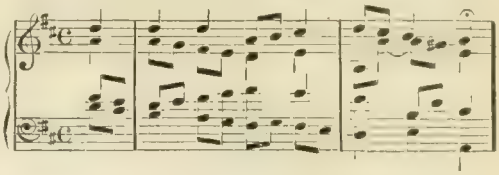
The management of the community was entirely in the hands of Rapp during his lifetime. After his death, in 1847, it passed to a board of elders, of whom Jacob Henrici was most prominent as trustee. Since 1891 John S. Duss has been the active manager. With not a few vicissitudes, throughout much of its career, the society has enjoyed great prosperity. In 1874 its property was valued between $2,000,000 and $3,000,000, and it had then 110 members, besides 25 or 30 children and hired laborers. The United States census in 1890 gave it 340 members. It was about that time heavily indebted, but has since been nearly freed from its obligations. The adoption of celibacy checked the growth of the society, and tended to repel converts. At present (November, 1902) the membership has fallen to eight. Plans for the restoration of the community are said to have been formed. Consult: Aaron Williams, *The Harmony Society at Economy, Pennsylvania, Founded by George Rapp, A.D. 1805, with an Appendix* (Pittsburg, 1876); Charles Nordhoff, *The Communistic Societies of the United States* (New York, 1874); William Alfred Hinds, *American Communities* (rev. ed., Chicago, 1902).

HARMO'NIUM (Neo-Lat., from Gk. ἁρμόνιος, *harmonios*, harmonious). A reed organ with bellows which are operated by the feet of the performer. The tone is produced by free vibrating reeds. The harmonium is a development from the older regal (q.v.). In 1810 Grenié exhibited the first harmonium, which he called *orgue expressif*, because this instrument was capable of greater expression, as well as of producing a crescendo and diminuendo. A. Debain, of Paris, improved it, and first gave it the name of harmonium when he patented his instrument in 1840. A complete revolution in the construction of the harmonium was begun in America when a mechanic who had worked in the factory of Alexandre in Paris emigrated to America. This man conceived the idea of a suction bellows, instead of the ordinary bellows which forced the air outward through the reeds. The firm of Mason & Hamlin, of Boston, in 1860 made their instruments with the suction bellows, and this method of construction soon superseded all others.

HARMONY (Lat. *harmonia*, Gk. ἁρμονία, harmony). The science which treats of chords, their structure, relation, progression, and resolution. As such it forms to-day the fundamental branch of the science of musical composition. All tones are regarded as elements of some fundamental chord, and for this reason the voices lose much of their individual freedom which they have in counterpoint, but are regarded more as affecting the relations of successive chords. As taught to-day, harmony comprises the study of intervals, chords, their structure, inversions, and chromatic alterations; progression of the various voices; suspensions, anticipations, and passing notes; modulation. Harmony, in our acceptation of the term, was unknown to the ancients. Only in the tenth century did a Flemish monk, Hucbald, conceive the idea of setting a second voice a fifth

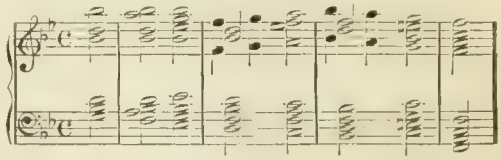
below the original cantus. This crude experiment was the beginning of harmony. In the sixteenth century Zarlino, in his great work *Istituzioni harmoniche*, established the consonance of the third, and also discovered the polarity of major and minor. That this discovery did not bear fruit immediately is due to the invention of figured bass, which determines all intervals from the *bass* tone instead of the *fundamental*. Tartini, in the eighteenth century, tried to develop Zarlino's ideas, but failed because he could not get away from the theories of figured bass. Thus the idea of the polarity of major and minor fell into oblivion, until in 1853 Moritz Hauptmann (q.v.) established this relation on a firm scientific basis. But after the third was once recognized as a consonance, the basis for the construction of chords was given. Still, music could not free itself from the fetters of the church modes (q.v.). Hence the development of music took place along the lines of polyphony (q.v.) or contrapuntal writing. Only after the establishment of the major and minor modes in place of the church modes, and the subsequent introduction of equal temperament (q.v.), which rendered modulation into all keys possible, could music develop harmonically. Thus Bach, while marking the highest development of the polyphonic contrapuntal style, at the same time marks the beginning of homophonic harmonic writing. Since then the progress of harmony has been very rapid. Progressions that startled one generation by their dissonance and boldness were accepted as pleasing and natural by the next, until, in the works of the great masters of the nineteenth century, we have a wealth and variety of harmonies that their predecessors never dreamed of. To-day all music is conceived as resting upon a *harmonic* basis. All tones are regarded on the basis of consonant chords, so that dissonant chords are conceived not as independent formations, but as modifications of a fundamental consonant chord. That this view is the only rational one, and rests upon a natural basis, is conclusively proved by the fact that the works of the greatest writers of the polyphonic style can all be reduced to a simple harmonic basis.

The importance of harmony in modern music cannot possibly be overestimated. Emotional expression depends almost entirely upon the choice of harmonies. The same melody harmonized differently is capable of expressing widely different moods and emotions. This is strongly illustrated by the leading motives in the works of Wagner. The same melodic phrase occurs frequently in a different harmonic garb in accordance with the varying demands of the dramatic situation. The development sections of Beethoven's symphonies and sonatas afford innumerable examples of wonderful and surprising effects produced by different harmonization of the original themes. Simple folk-songs can be invested with a transcendent beauty by a judicious, refined harmonization. For example: The simple German folk-song, *Es ist bestimmt in Gottes Rath*, appeals to every one through its tender melody sustained only by the simplest harmonic chords. Mendelssohn has taken this simple melody, and, without altering even a note, has harmonized it so exquisitely that his version appears like a high-art song. Upon closer examination, we will find that the tender sadness of the original melody has been intensified by Mendelssohn's rich harmonies into sorrowful resignation. It is highly interesting to compare the many harmonic settings of Luther's famous hymn, *Ein feste Burg ist unser Gott*. Bach's wonderful setting cannot be surpassed (ex. 1); and yet what a different character does



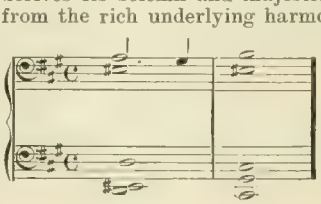
EX. 1.

Wagner impart to this simple melody when he introduces it in his *Kaisermarsch* (ex. 2). The



EX. 2.

three notes constituting the melodic outline of the motive of Fate in the Nibelungen are surely insignificant enough in themselves. This motive derives its solemn and majestic character solely from the rich underlying harmony (ex. 3). One more example to prove the importance of harmony. The principal theme of the allegretto in Beethoven's A major Symphony is almost appalling in its meagre monotonous melody. Yet, by means of the most marvelous harmonic combinations, the master has transformed it into one of the most impressive and deeply emotional phrases to be found in the whole range of music (ex. 4).

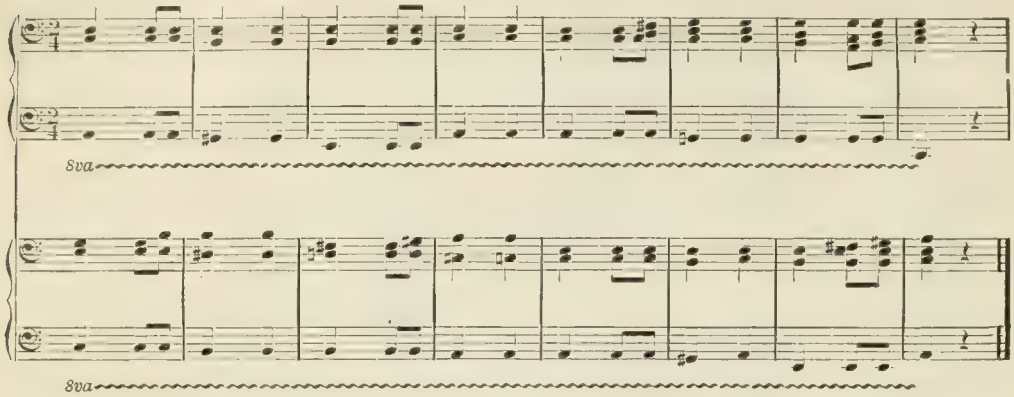


EX. 3.

In the great masters the gift of harmony is inborn. Wagner expressly declares that no melody ever occurred to him apart from its harmonic basis. Yet a talent for harmony can be cultivated to a certain extent. Every thorough musician is capable of harmonizing a given melody in several ways. Besides the choice of the chords there is another important factor, namely, the proper distribution to the different voices of the different tones composing a chord. This has to do with the leading of the voices and the rules to be observed in correct writing. It cannot be the object or purpose of an article like the present to attempt a technical exposition of so broad a subject as harmony. The following is, therefore, intended to give the general reader some idea of the scope and function of the various subjects comprised under the collective title of harmony.

INTERVALS. Under this heading the tones are treated in respect to the distance or difference in the degree of the scale that separates them one from the other. If two tones are sounded simultaneously they form *harmonic* intervals; if sounded successively, *melodic* intervals. All intervals are reckoned from the fundamental tone

of the scale. When the same tone is sounded on two different instruments the interval is called a *prime*, both tones being on the same degree of the scale. The tone upon the second degree forms the interval of the second with the fundamental tone, and so on, until the eighth degree is reached, which is the same as the first, one octave higher. Generally, all intervals are reckoned within one octave; thus C-e² is a third, although the two

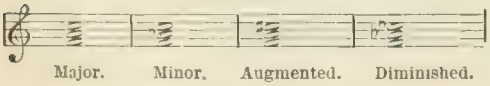


EX. 4.

tones are separated by more than three octaves. For theoretical purposes, however, the intervals of the ninth, tenth, eleventh, and twelfth are recognized. Intervals are classed as *consonant* and *dissonant*, and again as *major, minor, augmented, diminished*, and *perfect*.

CHORDS. Under this heading are treated the nature and formation of chords. The fundamental chord is the triad consisting of three tones, the prime, third, and fifth. According as the major or minor third is used, the chord itself is major or minor. The presence of an augmented or diminished interval renders the chord likewise augmented or diminished. All chords are constructed by means of thirds (ex. 5). By

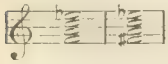
TRIADS.



Major. Minor. Augmented. Diminished.

EX. 5.

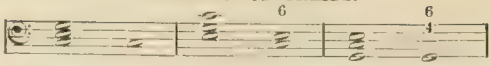
adding the interval of a third to any triad a chord of the seventh is obtained, so called because the last added tone forms the interval of a seventh with the fundamental tone of the chord (ex. 6).



EX. 6.

All chords can be inverted, i.e. any tone of a chord can be in the bass or lowest part. When the fundamental tone is in the bass the chord is said to be in its fundamental position. With the third in the bass we obtain the first inversion; with the fifth in the bass we have the second inversion (ex. 7). Chords of the seventh admit three inversions (ex. 8). With respect to the relative position of the various

INVERSION OF TRIADS.

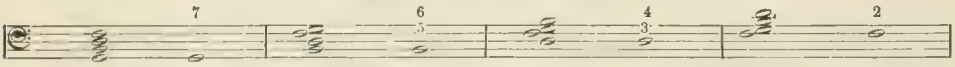


Fundamental. First Inversion. Second Inversion.

EX. 7.

tones composing a chord, a distinction is made between *close* and *open, spread* or *extended* harmony. In example 9 the first chord (a) is in *close* harmony because none of its tones can be transposed an octave, and still fall within the other tones of the chord. The second chord (b)

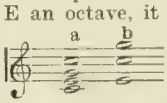
INVERSIONS OF CHORD OF SEVENTH.



Fundamental. First Inversion. Second Inversion. Third Inversion.

EX. 8.

is in *open* harmony, because by transposing the E an octave, it falls between the tones C and G of the chord (ex. 9). Likewise, transposing the G an octave lower, it falls between C and E.



EX. 9.

PROGRESSION OF CHORDS. Each tone composing a chord is regarded as belonging to a distinct voice or part. The rules governing the progression of chords are exceedingly few and simple, yet it requires long and constant practice to acquire the art of leading the voices correctly. (1) Parallel octaves and fifths are strictly forbidden. This means that two tones of one chord forming the interval of an octave or a fifth must not progress in such a manner as to form the same interval in the next chord (ex. 10). The example under (a) is bad because the progressions c-d and f-g produce fifths in both chords. The correct progression is given under (b). Octaves

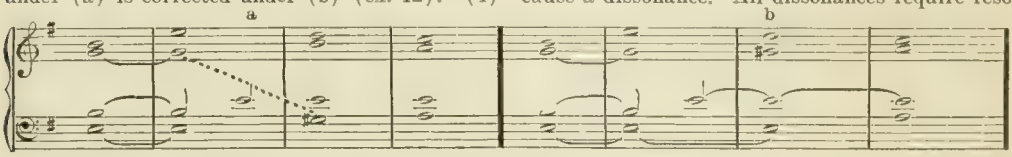
EX. 10.

and fifths may be open or covered. They are open, as in example 10 (a), when the forbidden intervals occur in both chords; covered when they occur only in the second chord as the result of parallel motion, as in the following (a) (ex. 11). These covered fifths can be avoided by leading the

voices, as under (b). (2) The leading tone can never be doubled. As the leading tone always

EX. 11.

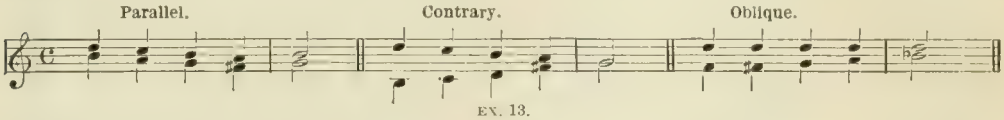
demands the progression of a semistep upward into the octave, it is clear that a doubling of this tone would necessitate the faulty progression of open octaves. (3) Chords must not progress so as to produce an inharmonic relation. This means that a tone of one chord cannot appear chromatically altered in the next chord, except in the same voice. For instance, if g appears in one chord in the tenor part, a g♯ or g♭ can be introduced in the succeeding chord *only* in the tenor part. In the following example the faulty progression under (a) is corrected under (b) (ex. 12). (4)



EX. 12.

The interval of the seventh is never to be doubled; neither is any augmented or diminished interval to be doubled, for all such intervals are dissonant, and hence are sufficiently prominent if they occur in only one voice.

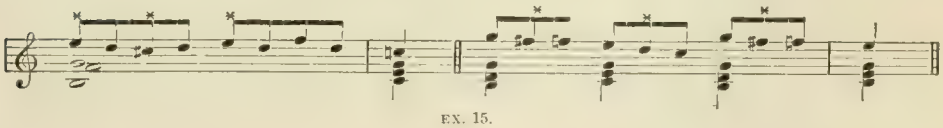
With respect to one another, the different voices



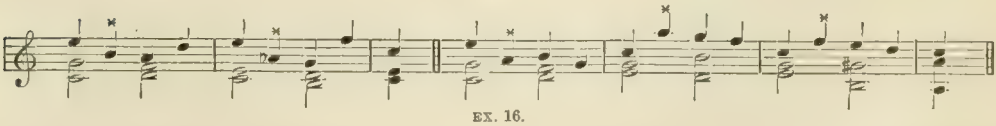
EX. 13.

may proceed in *parallel*, *contrary*, or *oblique* motion. The motion is *parallel* if both voices either rise or fall together; *contrary* when one rises and the other falls; *oblique* when one remains on the same tone, while the other either rises or falls (ex. 13). With respect to the number of voices

EX. 14.



EX. 15.



EX. 16.

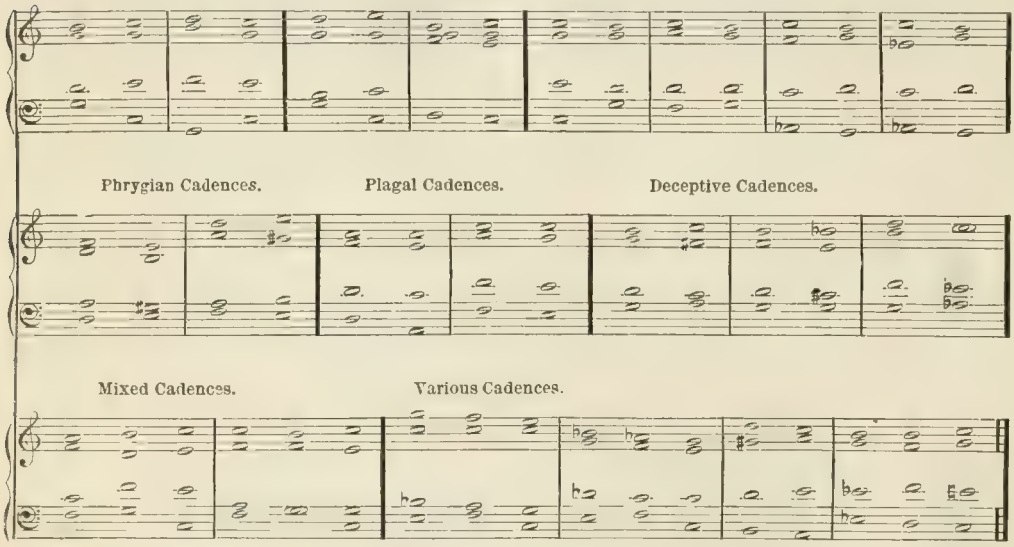
employed, a distinction is made between two-part, three-part, four-part, etc., writing. The kind most generally used is the four-part. As a triad contains only three tones, it is evident that in four-part writing one of the intervals must be doubled. This is generally the fundamental tone, often also the fifth, seldom the third. In two-part writing some interval must be omitted, and this is almost always the fifth. The number of parts is not restricted. There are compositions for as many as twenty-four, and even thirty-two parts. Of course it requires absolute mastery to handle such a number of parts.

Anticipations, Suspension, Resolution. Tones may also appear in other chords than the ones to which they belong. When one or more voices proceed to tones of the next chord, while the remaining voices sustain the harmony of the first chord, *anticipation* occurs. *Suspension* takes place when one or more voices hold the tone of the previous chord when the other voices have already proceeded to the harmony of the next chord. As the tones thus held do not belong to the chord with which they are sounded, they cause a dissonance. All dissonances require resolution into consonant chords. Anticipation occurs upon either the strong or weak beat of a bar; suspension only on the strong beat. Suspension, moreover, requires *preparation*, i.e. the tone suspended must occur in the previous chord as an essential element. The preparation takes place upon the weak beat, while the suspension itself occurs upon the strong beat (ex. 14).

Passing Notes and Changing Notes. By passing notes are meant notes of short duration that do not affect the harmony, but only serve as a connective element between chords, as in ex. 15 (passing notes marked*). A changing note is one that lies a second above or below a tone belonging to a chord. Whereas passing notes occur always in passages progressing by steps, changing notes generally proceed by skips, as ex. 16 shows (changing notes marked*).

In the above examples, only the soprano contains the passing and changing notes. It is possible, however, to have more or all voices move in notes of the same value as the soprano. The different tones of the different voices then form chords. All chords containing one or more of the notes marked * would then constitute *passing chords*.

CADENCES. It is important to pay attention to the closing of a piece. The two principal cadences are the *authentic* and the *plagal*. The authentic cadence is the resolution of the dominant chord into the tonic. When the soprano has the fundamental tone of the tonic, and the bass the fundamental tone of both the dominant and tonic chords, the close is called a *whole cadence*. It is at the same time a *perfect cadence*. The *whole cadence* is *imperfect* when the soprano has any other interval than the fundamental of the tonic, or the bass any other than the fundamental tone of the dominant chord. A *half cadence* is the resolution of the tonic into the dominant chord, the reverse of the *whole cadence*. Instead of the tonic chord other triads may be used, especially those of the second, fourth, or sixth degree. A half cadence that occurs very frequently and is very beautiful is the *Phrygian cadence*. It consists of the resolution of the sub-dominant into the dominant in the minor mode. The *plagal cadence* is the resolution of the sub-dominant into the tonic chord. The cadences just mentioned are the ones most frequently used at the close of a composition. But at the end of a phrase or section a close known as the *deceptive* or *interrupted cadence* is frequently found. This consists of the resolution of the dominant into some chord other than the tonic. A *mixed cadence* is the succession of the sub-dominant, dominant, and tonic chords, thus constituting a mixture of the authentic and plagal cadences. Besides the cadences enumerated, others not specially classified also occur. Thus the chord of the diminished seventh sometimes takes the place of the dominant or sub-dominant (ex. 17).



EX. 17.

MODULATION. Although every composition is written in a certain key, wearisome monotony would result were the composer to restrict himself only to chords properly belonging to that key. Chords belonging to other keys are introduced with more or less frequency. Every such departure from the original key is a modulation. To modulate with artistic effect the relation of the keys and the chords belonging to each must be thoroughly understood.

While pursuing the study of harmony the student at the same time is trained in the science of figured bass. It is the rule followed in all modern treatises on harmony to write out the exercises in figured bass notation. This indicates the choice of chords, whereas the leading of the voices and the distribution of the tones are left to the student.

There is no dearth of excellent works on harmony. Among the most famous are: Fétis, *Esquisse de l'histoire de l'harmonie* (Paris, 1840); *Traité complet de la théorie et de la pratique de l'harmonie* (Paris, 1844); Dehn, *Theoretisch-praktische Harmonielehre* (Berlin, 1840); Hauptmann, *Die Natur der Harmonik und der Metrik* (Leipzig, 1853, 1873); Marx, *Die Lehre von der musikalischen Komposition* (Leipzig, 1847, new edition revised by Riemann, Leipzig, 1889); Richter, *Lehrbuch der Harmonie* (Leipzig, 1888; translated into English by Morgan, New York, 1885); Jadassohn, *Harmonielehre* (Leipzig, 1883); H. Riemann, *Skizze einer neuen Methode der Harmonielehre* (Leipzig, 1880); *Die Natur der Harmonik* (Leipzig, 1882).

For detailed information of the various topics introduced in this article, compare the separate articles on ACOUSTICS; AUGMENTATION; CADENCE; CHORD; FIGURED BASS; INTERVAL; KEY; LEADING TONE; LEADING OF VOICES; MAJOR; MINOR; MODULATION; MOTION; PASSING NOTES; PROGRESSION; SCALE; SUSPENSION; TONALITY; HARMONICS.

HARMONY OF THE SPHERES, or MUSIC OF THE SPHERES. It was a common belief among

the ancients that the motions of the stars and planets produce a kind of music, which they called the harmony of the spheres. They attributed this music to the various proportionate impressions of the heavenly bodies on one another acting at proper intervals.

HARMS, härms, FRIEDRICH (1819-80). A German philosopher, whose concept of philosophy as the science of the absolute approaches Fichte. He was born at Kiel, and educated there and in Berlin. In 1848 he was appointed professor at Kiel, and in 1867 at Berlin. His writings are critical and historical, rather than constructive, and, although marked by depth of thought, fail in clearness of style. Among them are: *Der Anthropologismus seit Kant* (1845); *Prolegomena zur Philosophie* (1852); *Die Philosophie Fichtes* (1862); *Schopenhauers Philosophie* (1874); *Die Philosophie seit Kant* (1876); *Ueber den Begriff der Wahrheit* (1876); *Die Formen der Ethik* (1878); *Metaphysik* (1885), *Logik* (1886), *Ethik* (1898), *Naturphilosophie* (1895), *Psychologie* (1897), all edited by Wiese; and *Begriff, Formen und Grundlegung der Rechtsphilosophie* (1889).

HARMS, KLAUS (1778-1855). A distinguished German theologian. He was born May 25, 1778, at Fahrstedt. In 1797 he went to the gymnasium at Meldorf, and in 1799 to the University of Kiel. After supporting himself as family tutor from 1802 till 1806, he was appointed Deacon of Lunden, whence he was called in 1816 to Kiel, as archdeacon and afternoon preacher in the Nikolai Church. Next year, shortly before the tricentenary of the Reformation in Germany, he issued, in defense of Protestant orthodoxy, ninety-five theses, under the title, *Das sind die 95 Theses oder Streitsätze Dr. Luthers* (Eng. trans. of most of them in *Lutheran Church Review*, 1889). These produced a deep impression throughout Germany, and brought him a call to be bishop of the consistory about to be instituted for the Protestant Church of Russia. This, as well as a call in 1834 to succeed Schleiermacher in Trinity Church, Berlin, Harms refused. In 1835 he was made chief pastor and provost in Kiel, but was compelled to resign in 1849, in consequence of an attack of almost total blindness. The rest of his life was spent in retirement, devoted to literary activity. He died in Kiel February 1, 1855. Harms's published works are chiefly sermons, which may be reckoned among the best specimens of modern pulpit eloquence in Germany. Of these, the most famous are his *Winterpostille* (1808, 6th ed. 1846), and *Sommerpostille* (1815, 6th ed. 1846), to which a new series was added—*Neue Winterpostille* (1826), and *Neue Sommerpostille* (1827). Consult: Dorner, *Blätter der Erinnerung an das Jubiläum von Harms* (Kiel, 1842); *Harms' Lebensbeschreibung verfasst von ihm selbst* (ib., 1851, 2d ed. 1852); and for his life, Volbehr (Kiel, 1878).

HARMSWORTH, ALFRED CHARLES (1865—). An English editor, born at Chapelizod, near Dublin. He was educated under a private tutor and at the Stamford Grammar School, and in 1882 joined the staff of the *Illustrated London News*. In 1888 he started the weekly journal *Answers;* in 1894 secured control of the *London Evening News;* and two years later founded the *London Daily Mail*. In 1898 he began the publication of *Harmsworth's Magazine*. He is perhaps most widely known in connection with the Jackson-Harmsworth Arctic Expedition of 1894, which he equipped. In December, 1900, he visited the United States, and while there brought out a special issue of a New York newspaper to illustrate his theory of what a paper of the future would be. Its form was that of a 32-page quarto magazine.

HARNACK, här'nàk, ADOLF (1851—). The foremost of living Church historians. He was born at Dorpat, Russia, May 7, 1851; educated at the university there (1869-72); became privat-docent at Leipzig (1874), professor extraordinary of Church history there in 1876; ordinary professor of Church history at Giessen (1879), at Marburg (1886), and at Berlin (1889). He is a man of strong and inspiring personality, and his lectures at Berlin are attended by hundreds of students from both Europe and America. His editorial activity has been great, as is attested by the facts that since 1881 he has edited with E. Schürer the *Theologische Litteraturzeitung*, a semi-monthly critical review (Leipzig, 1876, sqq.), and since 1882 with O. von Gebhardt the *Texte und Untersuchungen zur Geschichte der altchristlichen Litteratur* (Leipzig, 1882-1902), a series of learned monographs (22 volumes) to which he also contributes. He also joined Von Gebhardt and T. Zahn in bringing out *Patrum Apostolicorum Opera* (Leipzig, 1875-77, 3 vols.). But his fame chiefly rests upon his separate publications, some of which are: *Zur Quellenkritik der Geschichte des Gnosticismus* (1873); *Die Zeit des Ignatius* (1878); *Das Mönchtum* (1881, 5th ed. 1901; trans. *Monasticism: Its Ideals and Its History*, 1895; with article on *The Confessions of Saint Augustine*, 1901); *Martin Luther in seiner Bedeutung für die Geschichte der Wissenschaft und der Bildung* (1883, 3d ed. 1901); *Lehrbuch der Dogmengeschichte* (1886-90, 3d ed. 1894-97; Eng. trans., *History of Dogma*, 1895-1900); *Grundriss der Dogmengeschichte* (1889, 3d ed. 1898); *Das apostolische Glaubensbekenntniss* (1892, 27th ed. 1897; trans., *The Apostles' Creed*, 1901); *Geschichte der altchristlichen Litteratur bis Eusebius:* vol. i., *Die Ueberlieferung und der Bestand der altchristlichen Litteratur* (1893); vol. ii., *Die Chronologie der Litteratur bis Irenäus* (1897); *Das Christentum und die Geschichte* (1895, 4th ed. 1897; trans., *Christianity and History*, 2d ed. 1901); *Das Wesen des Christentums* (1900; trans., *What is Christianity?* 1901); *Vorstudien zu einer Geschichte der Verbreitung des Christentums in den ersten drei Jahrhunderten* (1901).

HARNACK, AXEL (1851-88). A German mathematician, son of Theodosius Harnack (q.v.), and twin brother to Adolf Harnack. Born at Dorpat, he studied there (1869-73), and then at Erlangen and Munich. He was privat-docent at Leipzig in 1876, professor in the Polytechnic Institute at Darmstadt, and then at Dresden. Besides several contributions to the *Mathematische Annalen* (vols. ix., x., xii., xiii., xiv., xvii., xix., xxi.), he wrote: *Elemente der Differential- und Integralrechtung* (1881) and *Grundlagen der Theorie des logarithmischen Potentials und der Potentialfunktion in der Ebene* (1888). Consult

the biography by Voss, in the *Mathematische Annalen* (vol. xxxii., Leipzig, 1894).

HARNACK, THEODOSIUS (1817-89). A German Lutheran theologian, father of Adolf and Axel (q.v.). He was born at Saint Petersburg, Russia, January 3, 1817; was educated at Dorpat, and taught there (1843-53); at Erlangen (1853-66); Dorpat again (1866-75), when he retired. He died at Dorpat, September 11, 1889. His specialty was practical theology, and he wrote the well-known *Praktische Theologie* (1877-78), and other books in that department.

HARNED, här'nĕd, VIRGINIA (1868—). An American actress, the wife of E. H. Sothern (q.v.), to whom she was married in 1896. She was born in Boston, and when about sixteen first became a member of a traveling company. Her New York dĕbut was in *A Long Lane*, at the Fourteenth Street Theatre (1890). In 1895 she appeared as Trilby, in Paul Potter's dramatization. Prominent among her subsequent parts have been Lady Ursula in *The Adventure of Lady Ursula* (1897); Ophelia, to Mr. Sothern's Hamlet (1900); Alice Rousillon in *Alice of Old Vincennes* (1901); and Iris in A. W. Pinero's play of the same name (1902). Consult Strang, *Famous Actresses of the Day in America* (Boston, 1899).

HARNESS. See SADDLERY.

HAR'NESS, WILLIAM (1790-1869). An English author and divine, educated at Harrow, where he formed a life-long friendship with Byron, and at Christ's College, Cambridge (B.A. 1812; M.A. 1816). He entered holy orders and became known as one of the most eloquent preachers in London. By his efforts was built the Church of All Saints, Knightsbridge (1849), of which he was perpetual curate till his death. Many of his sermons were published; but he is now remembered chiefly for his edition of Shakespeare (8 vols., 1825). Consult L'Estrange, *Literary Life of Harness* (London, 1871).

HARNESS CASK. A large wooden cask, commonly shaped like the frustum of a cone, flattened at the sides, and used on board ship for the temporary stowage of salt provisions which are intended for issue to the crew within a day or two. Sailors call salt beef *salt horse*, and of course a *harness* is the most natural thing to be around a horse—hence the name.

HARNESSED ANTELOPE. A bushbuck of the genus Tragelaphus, so called because most of them have irregular stripings and spottings of white on a dark ground, suggesting a harness. Most of them belong to the jungles of West and South-Central Africa, and the list includes the bongo and guib (see the article BUSHBUCK), the nyala and sitatunga. See Colored Plate of ANTELOPES.

HAR'NETT, CORNELIUS (1723-81). An American patriot, born probably in Chowan County, N. C. He was among the first to oppose the Stamp Act; represented Wilmington in the Provincial Assembly from 1770 to 1771; served in 1774 on the Wilmington Committee of Safety; and was the temporary executive of North Carolina after the departure of the royal Governor. He was a delegate to the Continental Congress from 1777 to 1779, and was a signer of the Articles of Confederation. The proclamation of general pardon, issued by Governor Clinton, excluded Harnett, and in 1780 he was made a prisoner of war, and died in captivity the next year.

HAR'NEY, JOHN HOPKINS (1806-67). An American journalist, born in Bourbon County, Ky. He graduated at Oxford University, Ohio, was professor of mathematics at the University of Indiana (1828) and Hanover College (1833), and then became president of a college in Louisville, Ky. (1839-43). He published an *Algebra* for school use in 1840. For twenty-three years (1844-67) he was editor of the *Louisville Democrat*, and made himself felt before and during the Civil War, while afterwards he played a conciliatory part.

HARNEY, WILLIAM SELBY (1800-89). An American soldier, born near Haysboro, Tenn. He entered the United States Army, and rose to be lieutenant-colonel of dragoons in 1836. He served in the Black Hawk War, in the Florida War, and in expeditions into the Everglades, and during the Mexican War was brevetted brigadier-general for gallantry at Cerro Gordo. In 1858 he was appointed to the command of the Department of Oregon, and subsequently to that of the Department of the West. In 1861, while journeying to Washington, he was taken prisoner by Confederates and brought to Richmond. Upon his release he issued proclamations to the people of Missouri, describing the evils certain to follow from secession. He was retired in 1863, and in 1865 was brevetted major-general. Consult Reavis, *Life and Military Services of Gen. W. S. Harney* (Saint Louis, 1878).

HAROËRIS, hä'rō-ē'rĭs, or **HARUËRIS** (from *Hor*, *Horus* + *uêr*, great, adult). An Egyptian god. Originally, he was merely a phase of the sun-god Horus, representing the sun in summer, or taking the daily course as the type of the yearly, the sun at its full height, at noon. He is regularly represented as a hawk-headed king, wearing the two crowns of Egypt. Originally he was the son of Osiris and his sister Isis, conceived while his parents were in the womb of their mother, Nuet (i.e. the sky). Later, however, when the two phases of the young and the adult sun were represented by two distinct deities, he became not only a brother of Harpocrates (q.v.), but even a brother of Osiris and son of Nuet, the sky, and Seb (or Gêb?), the earth (Plutarch: Rhea and Kronos), while other inscriptions make him son of other forms of the old Sun (Rê or Atum). He was specially the god of Southern Egypt. See HORUS; HARPOCRATES.

HAR'OLD I., surnamed HAREFOOT (probably on account of his swiftness). King of England from 1037 to 1040. He is believed to have been the younger of Canute's two sons by his first wife, Ælfgifu. According to agreement on Canute's second marriage to Emma, widow of Ethelred II., his son by Emma was to inherit the English as well as the Danish throne; this son, Hardecanute (q.v.), was, however, in Denmark at the time of his father's death in 1035. Leofric, Earl of Mercia, favored the cause of Harold, while the powerful Earl Godwine espoused that of Hardecanute. Civil war was averted by a compromise, and the kingdom was divided. Harold took London, with all the provinces north of the Thames, while the possession of Wessex was

given up to Emma for Hardecanute. She fixed her residence at Winchester, and established her authority over her son's share of the kingdom. In 1037 the thanes and people of Wessex, disgruntled by Hardecanute's prolonged absence in Denmark, submitted to Harold, and he was crowned King of all England. He is said treacherously to have slain the Ætheling Ælfred, the younger of the two sons of Ethelred and Emma, whom he had invited to England. He died at Oxford, March 17, 1040. Consult Freeman, *The Norman Conquest*, vol. i. (Oxford, 1869).

HAROLD II. (1022?-66). King of England in 1066. He was probably the second son of the powerful Earl Godwine. In 1045 Harold was Earl of East Anglia. In 1051, when Godwine fell into disgrace with Edward the Confessor, Harold raised troops in Ireland, and plundered the English coast until reëstablished in his earldom. After his father's death, in 1053, Harold inherited the Earldom of Wessex, and all his father's property and power, and became the head of the National Party, which sought to counteract the Norman influence at the Court of Edward the Confessor. In 1062-63 with his brother Tostig he invaded Wales, and inflicted such a terrible chastisement on the inhabitants that the English frontier was safe from their raids for three-quarters of a century. It was probably in 1064 that he made his visit to Normandy, and took an oath to assist William in obtaining the English crown. The common legend is that Harold was shipwrecked on the coast of Normandy, and fell into the power of Duke William, who forced him to swear on a chest full of sacred relics that he would aid him in his design. On the death of Edward the Confessor, January 5, 1066, the Witan (q.v.), in the exercise of its rights, set aside the claims of Edgar Atheling, the grandson of Edmund Ironside, and, ignoring the reputed bequest of the late sovereign in favor of the Duke of Normandy, elected Harold to fill the vacant throne. Duke William immediately asserted his claim, which was supported by Harold's brother Tostig, who had been dispossessed of his Dukedom of Northumbria, and Harald Haardraade, King of Norway, his ally. Tostig and the Norwegian King landed on the coast of Yorkshire, and after defeating Eadwine and Morkere, Earls of Northumbria and Mercia, advanced to York, but were met by Harold at Stamford Bridge, and totally routed September 25, 1066. A few days later William landed in England; the contending armies met at Senlac, about seven miles from Hastings (see HASTINGS, BATTLE OF), where Harold's defeat and death, October 14, 1066, made the Duke of Normandy undisputed ruler of England. Consult: Freeman, *The Norman Conquest*, vols. ii. and iii. (Oxford, 1875); Green, *The Conquest of England* (London, 1883). See ANGLO-SAXONS; ENGLAND.

HAROLD I. AND **HAROLD III.** Kings of Norway. See HARALD.

HAROLD EN ITALIE, ä'rôl'dä nē'tä'lē'. The fourth of Berlioz's five symphonies, composed in 1834 and founded on Byron's *Childe Harold*.

HAROLD, OR THE LAST OF THE SAXON KINGS. An historical novel, founded on the life of Harold II. of England, by Bulwer-Lytton (1848).

HAROUN AL-RASHID, hä-rōōn' äl rä-shēd'. See HARUN AL-RASHID.

HARP (AS. *hearpe*, Icel. *harpa*, OHG. *harpha*, Ger. *Harfe*, Lat. *harpa*, of unknown etymology). A musical stringed instrument, much esteemed by the ancients. In Egypt the figure of the harp is found delineated from the earliest ages in many different forms. The Celtic bards held the harp in the greatest honor. In the Highlands of Scotland the instrument has disappeared, but it is still in use in Wales, and to some extent it lingers in Ireland, where, from its former prevalence, it is adopted as a national symbol. The harp was used as an accompaniment to the psalms sung by the early congregations of Christians. There are three kinds of harps now known. The ordinary Italian harp is strung with two rows of wire strings, separated by a double sounding-board; this kind is now practically obsolete, being very imperfect. The double harp, or, as it is also called, David's harp, is a more useful instrument in the form of a triangle, with a sounding-board and gut strings; it is always tuned in the principal key of the music, while the strings are altered to suit any modulations out of the key, by pressure of the thumb, or turning the tuning-pins of certain notes. These defects led gradually to the invention of the pedal harp, which has seven pedals, by which each note of the diatonic scale, in all the different octaves, can be made a semitone higher. A celebrated harpist, Hochbrucker, in Donauwörth, invented the pedals in 1720; while J. Paul Velter, in Nuremberg, in 1730, added the piano and forte pedal. After numerous attempts at further improvements, the harp at length reached a degree of perfection by the invention of the double-action pedal harp by Erard in Paris in 1820. By means of Erard's invention, each string can be sharpened twice, each time a semitone; so that the C string may be C flat, its full length, C natural by the first movement of the pedal, and C sharp by the next movement. The double-action harp is tuned with all the pedals half-down, and in the key of C natural. It has 46 or 47 strings and a compass of over six octaves from $_1C$-g^4. The music is written on two staves, exactly as for the pianoforte. The instrument is now found in all large orchestras. For producing beautiful arpeggio effects the harp has no rival. In the final scene of *Das Rheingold* (the entrance of the gods into Walhall) Wagner employs no less than eight harps.

HARP, or SADDLEBACK SEAL. A hair-seal of the North Atlantic (*Phoca Grœnlandica*) which wanders widely, but usually is numerous off the coasts of Greenland and southward to Newfoundland, gathers in herds about the ice-floes, and is slaughtered by sealers in great numbers. It is yellowish-white when fully adult (when the males have a black head), with an irregular circle of dark marks on the back, inclosing a space which somewhat resembles a harp or a saddle. To the Eskimos these seals are of value for food, and summer clothes as well as tents are made of the skins.

HARPAGON, är'pä'gōn'. A miser who nearly starves his horses, lets his servants go half-clothed, and begrudges himself even the expense of a decent wedding banquet. He is the principal character in Molière's *L'Avare*.

HAR'PALUS (Lat., from Gk. Ἅρπαλος) (c.330 B.C.). Kinsman and comrade of Alexander the Great. Made chief of the treasury in the expedition to Asia, he was found guilty of embezzlement. Alexander pardoned him and in 330 made him custodian of the immense Persian treasure at Ecbatana. After squandering enormous sums in the most reckless manner Harpalus fled to Athens (325) with 5000 talents, which he employed in purchasing the good-will of leading citizens, among them, it is said, Demosthenes. From Athens he went to Crete, where he was assassinated.

HAR'PER, JAMES (1795-1869). An American publisher, born at Newtown, L. I. In 1811 he removed with his brother John (1797-1875) to New York, where they learned the trade of printing and established the firm of J. & J. Harper, printing for booksellers and publishers. James Harper was said to be the quickest and best pressman in New York City, and the proofreading of John Harper had an equal reputation. They published on their own account from 1818 to 1833, when with two younger brothers, Joseph Wesley (1801-70) and Fletcher (1806-77), they formed the firm of Harper & Brothers. The keen business sagacity and sterling honesty of James Harper soon made the firm the largest and most respected publishing house in the United States. He was among the first to issue series of books grouped into so-called 'libraries,' covering topics ranging from juvenile fiction to the classics, and founded *Harper's Magazine* in 1850, which with the two publications suggested by Fletcher Harper, *Harper's Weekly*, established in 1857, and *Harper's Bazar*, established ten years later, soon took high rank in the field of periodical literature. The series was supplemented in 1881 by *Harper's Young People*, afterwards called *Harper's Round Table*. From 1844 to 1846 James Harper was Mayor of New York City, and was subsequently suggested for State Governor, but his distaste for public life led him to discountenance all efforts in his behalf. In March, 1869, he was thrown from a carriage and killed, and for many years after his death the business of the firm was conducted by younger members of the family. After the failure of the firm in 1899, it was entirely reorganized as a stock corporation.

HARPER, JOHN MURDOCH (1845—). A Canadian educator. He was born at Johnstone, Renfrewshire, Scotland, emigrated to Canada, and graduated at Queen's University, Kingston. His success as the head of several schools induced the Government of Prince Edward's Island to appoint him in 1887 superintendent of education for the province. Having declined this appointment, he became in 1880 rector of the Quebec High School, and subsequently inspector of superior schools for Quebec Province. His publications include many brochures and editions of textbooks.

HARPER, ROBERT GOODLOE (1765-1825). An American lawyer and politician, born near Fredericksburg, Va. He was early taken by his parents to South Carolina, and at the age of fifteen served in the volunteer militia of South Carolina during Greene's last campaign against Cornwallis in the South. After the close of the war he entered Princeton, where he graduated in 1785. The following year he was admitted to the bar at Charleston, S. C., and removed into the interior of the State to practice. He was an ardent Federalist, and wrote and spoke in favor of the adoption of the Federal Constitution. After several terms in the State Legislature, he was, in 1795, elected to Congress, where he served until 1801. He was a fluent speaker and a ready debater, and his able advocacy of the measures of Washington and Adams won for him a high place in the councils of the Federalist Party. In 1799-1801 he was the recognized leader of his party in the House. After the expiration of his Congressional term he removed to Baltimore, Md., where he married the daughter of Charles Carroll of Carrollton, and became one of the leading lawyers in the country. He served in the War of 1812 as a major-general in the Maryland militia. In 1803 he was the principal counsel for Judge Pickering in the impeachment proceedings brought against him, and in 1806, with Luther Martin and others, successfully conducted the defense of Justice Chase in his impeachment trial. He was elected United States Senator from Maryland in 1816, but resigned in the same year because of his candidature for the Federalist nomination for Vice-President, which, however, he failed to obtain. He was one of the principal promoters of the scheme for the colonization of free negroes in Africa which resulted in the establishment of Liberia. He published: *An Address on Observations on the Dispute Between the United States and France* (1797); *Letters on the Proceedings of Congress;* and *Letters to His Constituents* (1801). A collection of his letters, pamphlets, and addresses was published under the title of *Select Works of Robert Goodloe Harper* (1814).

HARPER, WILLIAM RAINEY (1856—). An American educator. He was born in New Concord, Ohio, July 26, 1856, of Scotch-Irish ancestry. He graduated at Muskingum College in 1870, and in 1875 received the doctor's degree from Yale. After teaching in the Masonic College, Macon, Tenn., and in the preparatory department of Denison University, Granville, Ohio, he became professor of Hebrew in the Baptist Union Theological Seminary in Chicago in 1879. While here he perfected a system of teaching Hebrew by correspondence. In 1886 he was elected professor of Semitic languages in the graduate faculty of Yale, and in 1889 also professor of biblical literature. From 1885 to 1891 he served as principal of the Chautauqua College of Liberal Arts, and in 1891 became principal of the Chautauqua system. In the last-mentioned year he was elected to the presidency of the newly founded University of Chicago, where he is also head professor of Semitic languages and literature. His published works include: *Elements of Hebrew* (2d ed. 1890); *Hebrew Vocabularies* (5th ed. 1890); *Hebrew Method and Manual* (1885); *Elements of Hebrew Syntax* (1888). He has been the founder and editor of several publications, among them *The Hebrew Student* and *Hebraica*, and is at present one of the editors of the *Biblical World*, the *American Journal of Theology*, and the *American Journal of Semitic Languages and Literature*—all published by the University of Chicago.

HARPER'S FERRY. A town in Jefferson County, W. Va., 55 miles northwest of Washington; on the Baltimore and Ohio Railroad (Map:

West Virginia, G 2). Its site, in a valley formed by Bolivar, Maryland, and Virginia or Loudoun Heights, and at the confluence of the Shenandoah River with the Potomac, is one of remarkable beauty. The town is the seat of Storer College (Free Baptist), a normal school for negroes. Population, in 1890, 958; in 1900, 896.

Harper's Ferry is chiefly notable from its connection with the raid of John Brown (q.v.), who, at the head of eighteen men, seized the armory here on October 16, 1859, and held it until captured on the following day by United States troops under Gen. Robert E. Lee. On April 18, 1861, immediately after Virginia had seceded from the Union, the small Union garrison, consisting then of only 45 men under Lieutenant Roger Jones, on the approach of a greatly superior force of Virginians under Gen. John Kenton Harper, abandoned the place, and fired the Federal arsenal, destroying about 20,000 rifles and pistols, and other property. The Confederates then gathered here a considerable force, which was first under Colonel Jackson, later known as 'Stonewall' Jackson, and afterwards under Gen. Joseph E. Johnston, both of whom energetically drilled and organized their troops. Johnston withdrew on June 15th, and soon afterwards another Union force took possession. The existence of a garrison here in September, 1862, compelled General Lee to divide the army of invasion which he was about to lead into Pennsylvania, and on the 15th General Jackson, after a prolonged bombardment, captured the place, securing about 12,500 prisoners and considerable material of war. Consult Johnson and Buel (editors), *Battles and Leaders of the Civil War*, vols. i. and ii. (New York, 1887).

HARPIGNIES, är'pē'nyē', Henri Joseph (1819—). A French landscape painter. He was born at Valenciennes, July 28, 1819. He was a pupil of Achard in Paris, and made his début in the Salon of 1853. His first picture which commanded attention was "The Edge of a Wood on the Banks of the Allier," which he exhibited in the Salon of 1861. Harpignies was at first but little appreciated, but his seriousness of purpose, true love of nature, and force of drawing at length told on both artists and public. His landscapes evince a fine sense of the structure of the land, and many of his pictures are noted for the justice of their retreating planes. His foreground and distances sustain frankly their relative positions on his canvases. At times he displays a certain hardness of technique, but the observer is repaid by his faithfulness of drawing and his fidelity in both form and color. He is an officer of the Legion of Honor, and has received various medals, among them the medal of honor at Paris in 1897. Among his oils are "View of Capri" (1855); "A Storm" (1859); "Evening in the Campagna" (1866), in the Luxembourg Museum; "The Valley of Egérie" (1870, a decorative panel for the Opera); "Le Saut du loup" (1873), a view on the Allier, and "Moonrise" (1884), both in the Luxembourg; "Banks of the Sarthe" (1892), "Banks of the Rhone" (1897), and "Moonrise," in the Metropolitan Museum, New York. Harpignies is equally excellent in his water-colors, among which may be mentioned: "Garden of the Villa Medici," Rome; "Le Pont-Neuf" (a bridge in Paris); "L'heure de la bécasse."

HARPIN, är'pāN'. An unscrupulous financier in Molière's *Comtesse d'Escarbagnas*. The character is a satire on a notorious class during the age of Louis XIV.

HARPOC'RATES (Lat., from Gk. Ἁρποκράτης, *Harpokratēs*). The name given by the Greeks to a form of the ancient Egyptian god Horus. The Egyptian name, *Har-pekhrod*, means 'Horus, the child,' in opposition to Haroëris (q.v.), 'the adult Horus.' Therefore, this god is usually depicted as a naked babe sucking his finger and wearing the plaited side lock, the sign of youth, at the right side of his head. Sometimes an amulet in the shape of a heart hangs around his neck; he usually wears one or both of the crowns of Egypt. Often he is represented as sitting on or emerging from a lotus-flower, the divine flower growing in the primeval, chaotic waters from which the sun-god first arose. Whether he was originally conceived as the young sun rising in the morning, as the sun at the winter solstice, or as the sun appearing in the primeval abyss, cannot well be determined; all three views are maintained. In Greek times the two forms of Horus, Harpocrates and Haroëris, were so strongly differentiated as to become two distinct deities, so that Harpocrates was understood as a posthumous brother of the 'elder Horus,' of weakly, immature form. The Greeks added the strange misconception of taking Harpocrates for a god of reticence, explaining his gesture with the finger as a sign demanding silence. Together with the other divinities of the Osirian circle, Harpocrates became very popular at Rome, but the continued misinterpretations of his cult (from a god of reticence he became a giver of oracles by dreams, etc.) seem to have led to abuses, and his worship was forbidden in the consulship of Gabinius, though it became very popular again in the days of Pliny.

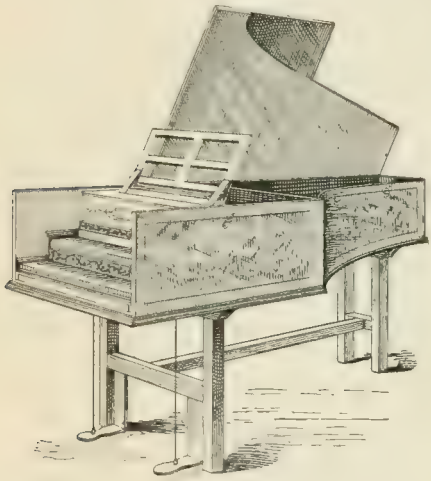
As a distinctive divinity Harpocrates represents one of the youngest personalities of the Egyptian pantheon. He is often identified with *Har-sam-toui*, 'Horus, uniting both countries,' more rarely with Khonsu, Atum, etc. Harpocrates was worshiped at Denderah, Esneh, Thebes; he had seven differentiated forms at Hermonthis. See also Haroëris.

HAR'POCRA'TION (Lat., from Gk. Ἁρποκρατίων, *Harpokratiōn*), Valerius. A Greek grammarian and lexicographer of Egypt, respecting whose personal history nothing is known. Some have considered him to be the Greek instructor of the Emperor L. Verus mentioned by Julius Capitolinus, while others suppose that he lived some time later, because several passages are found in his works taken from Athenæus, who is supposed to have flourished about A.D. 200. Harpocration is the author of a valuable lexicon to the ten Attic orators, which contains much information on the law, history, antiquities, and general literature of Athens. The value of this work is enhanced by the fact that all the authorities from which it has been compiled are lost. Harpocration is also the author of a lost work entitled *Collection of Flowery Extracts* (Ἀνθηρὰν Συναγωγή).

HARP-SHELL (so called because the ribbing of the shell resembles the strings of a harp). A gastropod mollusk of the family Harpidæ, hav-

ing the last whorl of the shell very large, the shell ribbed longitudinally, the foot of the animal very large. The species, which are not very numerous, are found in the warmer seas, and particularly at Mauritius. The shells are much prized for their great beauty, but must be kept in drawers and not exposed to light, or their delicate and brilliant colors will fade.

HARPSICHORD, härp'sĭ-kôrd (OF. *harpe-chorde,* from *harpe,* harp + *chorde,* chord, cord). A keyed musical instrument, formerly in extensive use, but now little known. In shape it was exactly like a grand pianoforte, to which its internal arrangements were also similar. The sound from the strings was produced by a small piece of crow-quill, or a piece of hard leather, which projected out of a slip of wood, called the jack, that stood upright between the strings, and was pushed upward by the key till the quill, or leather, twitched the string, causing a brilliant but somewhat harsh sound, deficient of any



HARPSICHORD.

means of modification in respect to loudness or softness. Specimens of the harpsichord, although now becoming quite rare, are still to be found in good preservation, but rather as articles of virtu or curiosity than as useful musical instruments. Many Italian and Dutch harpsichords were highly ornamented by the most eminent artists with valuable oil paintings on the inside of the lid. The date of the invention of the harpsichord is uncertain. Before the fifteenth century there is no trace of its existence. It was introduced into England early in the seventeenth century. In the eighteenth century Kirkman, and later Broadwood and Schudi, were the famous makers in London. After the invention of the pianoforte (q.v.) the harpsichord and all instruments of the same kind, such as the spinet, were in time entirely superseded. The harpsichord shown in the accompanying illustration was presented to Nelly Custis by George Washington. It was made in London, is eight feet long, three and a half feet wide, and has two banks of 120 keys.

HARPUT. See KHARPUT.

HAR'PY (Lat. *harpyia,* from Gk. Ἅρπυια, from ἁρπάζειν, *harpazein,* Lat. *rapere,* Alban. *rjep,* to snatch). In Greek legend, a personification of the swift destructive wind-storm, and hence also a symbol of death. In this character they are found on Lycian graves, monuments, and elsewhere, carrying away the departed. In legend they are the daughters of Thaumas (the personification of the wonders of the sea) and Electra, and sisters of Iris. Commonly only two are mentioned, Ælio (Ἀελλώ) and Okypete (Ὠκυπέτη). In Homer the harpy Podarge is by Zephyrus, the mother of the horses of Achilles. Later writers mention other names, as Celæno, who in Vergil is their leader. The later writers also make them loathsome and filthy, bringing pollution to all that they approach. The harpies appear in the Argonautic legend as sent by the gods to punish the blind Phineus, whose food they carry off. They were pursued by the winged sons of Boreas, Zetes, and Calais, and either killed or, in the usual version, forced to promise to cease harassing Phineus. In the earlier art the harpies are represented as winged human beings. Later they appear regularly with the head, breasts, and arms of a woman, but the claws, wings, and tail of a bird. This is their form on the celebrated Harpy tomb from Xanthus in the British Museum.

HARPY BAT. Two different kinds of bats are called 'harpies.' One is a genus of fruit-bats (Harpyia), of which there are two species in the East Indies, one about four inches long, and the other much larger. The fur of both is pale buff in color, and both have the nostrils prolonged into divergent tubes, so that the genus is frequently called 'tube-nosed.' See Plate of BATS.

Another group of 'harpy' bats is found in the insect-catching vespertilionine genus Harpyiocephalus, which is closely allied to our common North American bats. Though so far removed otherwise, this group agrees with the frugivorous genus (Harpyia) above mentioned, in having tubular nostrils—a remarkable similarity in two so divergent groups. These bats, of several species, inhabit India, the Malayan Archipelago, and Japan, and include one, the white-bellied harpy of the Himalayas, remarkable for its brilliant coloration, the fur being golden orange on the head, varying rust-red on the back and outer surface of the membranes, and white on the chin, throat, and abdomen. All have large ears, and numerous and very strong teeth, and they are believed to catch and crush beetles as well as to seize smaller insects.

HARPY EAGLE. A huge, crested bird of prey (*Thrasaëtus harpyia*), allied to the eagles and found in South and Central America and Mexico, occasionally coming as far north as the Rio Grande Valley. See Eagle; and Plate of EAGLES AND HAWKS.

HARQUEBUS, här'kwē-bŭs. See ARQUEBUS.

HAR'RADEN, BEATRICE (1864—). An English novelist, born at Hampstead and educated at Dresden, and in Cheltenham, Queen's, and Bedford Colleges, finally taking her degree, with honors in classics and mathematics, at the University of London (1883). She traveled on the Continent and in 1894-95 visited the United States, spending several months on a ranch in California. She created a sensation in 1893 by her novel *Ships that Pass in the Night.* Among her other novels are: *Things Will Take a Turn* (1891); *In Varying Moods* (1894); *Hilda Strafford* (1897); and *The Fowler* (1899).

HARRAR, HARAR, hä-rär′, or **HURRUR.** The most eastern province of Abyssinia, bounded on the north and east by French Somaliland and British Somaliland, and on the southeast and south by Italian Somaliland and British East Africa. It is a plateau, reaching an altitude of about 11,000 feet. Nearly all the foreign commerce of Abyssinia passes through this province. (See ABYSSINIA.) Capital, Harrar (q.v.). Harrar belonged to the Egyptian Sudan before the uprising of the Mahdi. Having been taken by Italy in 1891, it became an Abyssinian province in 1896, after the Italian defeat at Adowa.

HARRAR. The capital of the Province of Harrar in Eastern Abyssinia, south of the port Jibutil, and about 180 miles from the coast (Map: Africa, J 4). It is the second city of the country in importance, is surrounded by walls, and has a palace and several mosques and barracks. It is situated in a fertile district which produces principally coffee. The commerce is growing, and includes coffee, cotton, gum, ivory, and fruit. Harrar is connected by telegraph with Addis Abeba. A railroad from Jibutil to Harrar is nearly completed. Population, in 1900, 40,000, nearly all Harraris and Abyssinians. See HARRAR (province), and ABYSSINIA.

HARRARIS, här-rä′rēz. The people of Harrar, in Abyssinia. They are said to have been Himyaritic Semites in race and were formerly Christians, speaking a dialect of Geez. Now the population is greatly mixed with Gallas and Somali, both of Hamitic stock. They are nearly all monogamists, allowing the women to go unveiled and relieving them of much hard work.

HARRIER. See HOUND.

HARRIER (from *harry*, AS. *hergian*, to ravage, from AS. *here*, Goth. *harjis*, OHG. *heri, hari*, Ger. *Heer*, army; connected with OChurch *kara*, Lith. *kàras*, war, OPruss. *karjis*, army, OPers. *kāra*, army, people). The English name for the low-flying, meadow-haunting hawks of the subfamily Circinæ, called 'marsh-hawks' in the United States. See MARSH-HAWK.

HARRIER EAGLE. See EAGLE.

HARRIES, hä′rē-ēs, HEINRICH. The author of the Prussian national hymn, "Heil dir im Siegerkranz" (q.v.).

HAR′RIGAN, EDWARD (1845—). An American actor and playwright, noted for his representations of types of low life. He was born in New York City, and as a young man had a somewhat desultory career, working as a calker in various cities, till finally, in San Francisco, about 1868 he made his appearance upon the stage. Soon afterwards in Chicago with Anthony Cannon (Tony Hart) he won his first theatrical success, and in New York a little later his truthful and amusing sketches of local character were promptly appreciated. These sketches gradually developed into plays, interspersed with songs which were set to music by David Braham, and have been whistled and sung all over the country. Among the best known of Mr. Harrigan's pieces have been the *Mulligan* series, *McSorley's Inflation, Old Lavender, Pete, The Major, Squatter Sovereignty, Reilly and the Four Hundred, My Son Dan*, and *Marty Malone*. The partnership of Harrigan & Hart lasted till 1884; after which Mr. Harrigan conducted theatres in New York, and made tours in different parts of the country. One of his favorite rôles revived in recent years is that of George Coggswell in *Old Lavender*. Consult McKay and Wingate, *Famous American Actors of To-day* (New York, 1896).

HAR′RILD, ROBERT (1780-1853). An English inventor, born in London. After learning the trade of a printer, he began the manufacture of printers' materials in 1809, a venture which subsequently was developed into a large and profitable business. He was noted as an inventor and manufacturer of composition rollers for inking type, a process without which the use of cylindrical or machine presses would have been practically impossible. Whether he was the first or exclusive inventor of that process is doubtful; but he seems to have been the first extensive manufacturer of the rollers, which were substituted for the leather balls by which type had been inked for nearly three centuries. The stupidity and obstinacy of workmen temporarily prevented the use of the invention, which, however, soon became almost universal. Harrild established factories in London, and was widely respected as an enterprising and benevolent citizen. He bought the printing-press with which Benjamin Franklin worked in London. In 1841 the press was brought to the United States, and it is now in the Patent Office at Washington.

HAR′RIMAN. A city in Roane County, Tenn., 50 miles west of Knoxville; on the Emory River, and on the Queen and Crescent Route, the Southern, the Tennessee Central, and other railroads (Map: Tennessee, G 5). It is the centre of a section rich in coal, iron, timber, and agricultural lands, and has farm-implement works, a cotton-mill, iron-works, a foundry and machine shops, a tannery, a flouring-mill, planing-mills, a metal-bedstead factory, and other industrial establishments. The city, which is a temperance town, is the seat of the American University, founded in 1893, and of an industrial school for negroes. Harriman was founded in 1890, and was granted a special city charter in 1891. The government, as provided by the revised charter of 1899, is vested in a mayor, chosen biennially, and a city council, elected on a general ticket. Harriman owns and operates its water-works and electric-light plant. Population, in 1890, 716; in 1900, 3442.

HAR′RINGTON, JAMES (1611-77). An English political writer, born at Upton, Northamptonshire. He entered Trinity College, Oxford (1629), but left without a degree, and traveled on the Continent. Although a Republican, he was attached to King Charles I., whom, it is said, he accompanied to the scaffold. Resuming his earlier studies, he published in 1656 his famous political romance, *The Commonwealth of Oceana* (i.e. England). Harrington's main principle is that power rests upon property, especially landed property. He further argues that rulers should be elected by ballot for terms of three years. The work led to a lively controversy, in which Harrington took an active part. After the Restoration he was committed to the Tower on the charge of conspiracy. Weakened in mind by his imprisonment, he died insane, September 11, 1677. Consult *Oceana*, in Morley's Universal Library (London, 1887), and Dwight, in the *Political Science Quarterly* for 1887.

HARRINGTON, Mark Walrod (1848—). An American astronomer and educator. He was born at Sycamore, Ill., was educated at Evanston, Ill., graduated at the University of Michigan in 1868, and was a member of the faculty there from 1868 to 1876, with an interval in 1870-71, when, as a member of the United States Coast and Geodetic Survey, he visited Alaska. He studied at the University of Leipzig in 1876-77, and in the latter year proceeded to China as professor of astronomy in the Cadet School of the Tsung-li-Yamen or Foreign Office in Peking. Ill health caused his return to the United States in 1878, and for a year he was professor in the Louisiana State University. In 1879 he was appointed professor of astronomy and director of the observatory at his alma mater, a position he held until 1891, when he became director of the United States Weather Bureau at Washington. He resigned in 1895 to become president of Washington State University. In 1897 he retired to private life. He is the author of numerous scientific articles, pamphlets, and works, and until 1892 was editor of the *American Meteorological Journal*, which he founded in 1884.

HAR'RIOT, or **HARIOT,** Thomas (1560-1621). An English astronomer and mathematician, born at Oxford. He acted for some time as tutor to Sir Walter Raleigh, who, in 1585, appointed him surveyor to the Grenville's expedition to Virginia. Harriot published an account of this expedition in 1588, and the work was afterwards reprinted in Hakluyt's *Voyages*. On his return to England, after an absence of two years, he resumed his mathematical studies with zeal and success, but ill health prevented him from publishing his mathematical discoveries. He had an undoubted genius for algebra, as is shown by his posthumous work, *Artis Analyticæ Praxis ad Æquationes Algebraicas Nova, Expeditâ et Generali Methodo Resolvendas* (1631). In this treatise Harriot did for algebra in England what his friend Vieta, to whom he gives generous praise, had done in France—he put it on its modern basis. In the matter of symbolism he added the signs $>$ and $<$ to those which were just coming to be recognized as part of the universal language of algebra. He asserted the advantage, now fully recognized, of making the second member of an equation zero, although he did this only for particular cases, and he gave in substance the general theorem (often called by D'Alembert's name) that an equation of the nth degree has exactly n roots. Consult *Harriot Papers*, edited by Rigaud (Oxford, 1831). For his life, consult Stevens, *Thomas Hariot, the Mathematician, the Philosopher, and the Scholar* (London, 1900).

HARRIOTT, Mrs. F. C. See Morris, Clara.

HAR'RIS, Sir Augustus Henry Glossop (1852-96). A noted English theatrical manager, lessee of Drury Lane, Covent Garden (the Opera), and other theatres. He was the son of Augustus Glossop Harris, who was also a well-known manager, and was born in Paris. In 1873 he made his début as an actor at Manchester, and not long afterwards became stage manager at Covent Garden. He leased Drury Lane in 1879. Besides his subsequent productions, especially of melodrama and opera, both there and at Covent Garden, which he took in 1888, he became joint author of a number of plays, most frequently in collaboration with Henry Pettitt; among them were *Pluck* (1882); *A Run of Luck* (1886); *A Million of Money* (1890); and *The Prodigal Daughter* (1892). He was a member of the London County Council, and was sheriff in 1891, when he was knighted. His death, which was ascribed to overwork, occurred at Folkestone.

HARRIS, Chapin A. (1806-60). An American dentist, born at Pompey, N. Y. In 1839 he procured the charter for the Baltimore Dental College, the first separate school of dentistry ever founded, and established the *American Journal of Dental Science*, which he edited for twenty years. Harris wrote: *Principles and Practice of Dental Surgery* (1839); *Diseases of the Maxillary Sinus* (1842); and a *Dictionary of Dental Science* (1849).

HARRIS, Lord George (1746-1829). An English soldier famous in India. Born at Brasted, Kent, he was educated at Westminster School and the Woolwich Military Academy. By 1765 he was lieutenant in an artillery regiment, and in 1774 went as a captain to America, where he fought at Lexington, Bunker Hill, and in many other battles of the Revolutionary War up to 1778, when he went to the West Indies. He had suffered from serious wounds, capture by the French, and shipwreck before he entered on the second stage of his career, which was in India (1790-1800). There he distinguished himself in the campaigns against Tipu Sahib, commanded Fort William as major-general, and was both civil and military Governor of Madras. For his victory at Seringapatam, ending in the conquest of Mysore, Harris was promoted to be lieutenant-general (1801). He was made general (1812), and a peer of the realm (1815), under the title Baron Harris of Seringapatam and Mysore. In 1824 he was made governor of Dumbarton Castle on the Clyde.

HARRIS, George Washington (1814-69). An American humorist, born at Allegheny City, Pa. He was a jeweler's apprentice and afterwards captain of a Tennessee River steamboat, then a political writer for newspapers, and finally the creator of "Sut Lovengood," whose papers, written for Nashville journals (1858-61), appeared as *Sut Lovengood's Yarns* (1867)—one of the raciest of Southwestern books of humor, ranking with J. J. Hooper's *Simon Suggs*.

HARRIS, Howel (1714-73). The principal founder of Welsh Calvinistic Methodism. He was born at Trevecca in Wales; was brought up in the Established Church, and matriculated at Oxford in 1735. He was endowed with high oratorical powers, and his energy and enthusiasm carried his audiences by storm. He founded no fewer than 300 societies, and formed a sort of Protestant monastery, in which there lived about 120 persons. Both Wesley and Whitefield were his friends and preaching companions. He raised a regiment at the time when a French invasion of England was confidently expected, and moved about with his men, preaching in every encampment. His *Autobiography* was published in 1791. He also wrote *The Last Message and Testimony of Howel Harris, Esq., late of Trevecca in Wales. Found Among Some of His Papers* (1774), and other works in Welsh.

HARRIS, Isham Green (1818-97). An American politician, born near Tullahoma, Tenn.

After a very limited common-school education, he engaged in business, studied law at night, and was admitted to the bar in 1841. He served in the State Legislature in 1847, was a Democratic member of the House of Representatives from 1849 to 1853, was elected Governor of Tennessee in 1857, and was reëlected in 1859 and 1861. At a special meeting of the State Legislature, called in January, 1861, to consider the condition of the country, he recommended that the question of calling a convention to take action for or against the secession of Tennessee be submitted to a popular vote, and asserted that in his view the existing evils could best be remedied by the adoption of amendments to the Federal Constitution favorable to slavery; and after the people decided on February 9th both in favor of the Union and against the calling of a convention, the secession majority in the Legislature on May 1st authorized him to enter into a military league with the Confederate States, to raise troops for State defense, and to issue State bonds. On May 7th the League, which had previously been negotiated, was formally ratified by the Legislature. At the election held in June a large majority of the people voted in favor of secession and the representation of the State in the Confederate Congress, eastern Tennessee, however, remaining steadfastly loyal. In connection with the election charges of corruption and fraud were brought by the loyalist minority against the Governor and his friends. The Federal generals Grant and Buell soon gained virtual control of the State, Buell occupying Nashville with a considerable force, and in March, 1862, Harris fled to Mississippi. Soon afterwards he joined the Confederate Army, and served as aide successively to Gen. A. S. Johnston, who died in his arms at the battle of Shiloh, and to other Confederate generals in command of the Army of the West. On March 3, 1862, President Lincoln appointed Andrew Johnson Military Governor of Tennessee, and Harris played no further part of any consequence in State affairs during the progress of the war. After the war he lived first in Mexico and then in England, but returned to Memphis in 1867, speedily regained his control of State politics, and was elected to the United States Senate in 1876, 1882, 1888, and 1894, where he was distinguished for his great powers as a debater. He served on important committees, acted as chairman of the Committee on the District of Columbia, and in 1893 was elected President *pro tem.*

HARRIS, James (1709-80). An English philologist and classical scholar, born at Salisbury. He was educated at Wadham College, Oxford, and studied law at Lincoln's Inn, although he never intended to practice that profession. From his father, who died in 1734, he received an inheritance sufficient to enable him to devote himself henceforth to study. Harris's interests were mainly in the classics and especially in Aristotle's philosophy. He also took an active part in political life, serving first as a magistrate for his county, and then from 1761 until his death being the member for Christchurch in the House of Commons. In 1763 he was appointed a lord of the admiralty, and after three months a lord of the treasury. Eleven years later he became secretary and comptroller to the Queen. The works of Harris, which are now of historical interest merely, are a collection of three treatises, one on art, a second on music, painting, and poetry, and a third on happiness (5th ed. 1794); *Philosophical Arrangements* (1775), dealing with the Aristotelian philosophy; *Philological Inquiries* (1781), on style and literary criticism, and the book for which he is chiefly remembered, *Hermes, or a Philosophical Inquiry Concerning Universal Grammar* (1751), an attempt to force language into the forms of logic. He has also been supposed to be the author of *Spring, a Pastoral,* which was produced at Drury Lane in 1762. In 1801 his son, James Harris, first Lord Malmesbury, published a collection of his father's works in two volumes, with a biographical sketch.

HARRIS, James. An English diplomat. See Malmesbury, James Harris, first Earl of.

HARRIS, James Rendel. An English philologist, paleographer, and biblical scholar. He studied at Clare College, Cambridge, and was its fellow and librarian. He held professorships at Johns Hopkins University and Haverford College, and later became university lecturer in paleography at Cambridge University. Among his writings are: *The Teaching of the Apostles and the Sibylline Books* (1885); *The Teachings of the Apostles* (1887); *The Rest of the Words of Baruch* (1889); *The Diatesseron* (1890); *The Acts of Perpetua* (1890); *The Apology of Aristides* (1891); *Codex Sangallensis* (1891); *Popular Account of the Newly Recovered Gospel of Saint Peter* (1892); *Fragments of Ephrem Syrus* (1895); *Hermas in Arcadia* (1896); *Letters from Armenia* (1897); *Homeric Centones* (1898); *The Gospel of the Twelve Apostles* and *The Annotators of the Codex Bezæ* (1901).

HARRIS, Joel Chandler (1848—). An American writer of fiction, and journalist, born at Eatonton, Ga. His first occupation was that of a printer's apprentice. He studied law, and practiced at Forsyth, Ga., but also did editorial work, and in 1876 joined the staff of the Atlanta *Constitution,* of which he became editor in 1890. It was to this paper that he contributed the very successful studies of Afro-American folk-lore, collected in 1880 as *Uncle Remus, His Songs and His Sayings,* a volume which has become a classic of its kind, since it appeals alike to scientific students of popular tradition and to the general public, old and young. He continued to work the vein so happily discovered, in *Uncle Remus,* with other sketches, such as *Nights with Uncle Remus* (1884); *Mingo and Other Sketches* (1884); *Free Joe and Other Georgian Sketches* (1888); *Daddy Jake the Runaway and Short Stories* (1889); *Balaam and His Master* (1891); *Tales of the Homefolks in Peace and War* (1898), weaving into fiction frequent touches of folk-lore, as do the juveniles *Little Mister Thimblefinger* (1894), *Aaron in the Wildwoods* (1897), and several other volumes. Mr. Harris also made a memoir of Henry W. Grady (1890), and contributed to the history of his State a volume on *Georgia from the Invasion of De Soto to Recent Times* (1899). No one has more successfully portrayed the humorous side of negro character and imagination, but it would be an injustice to him to think that he has not also given an admirable picture of Georgia life in general, especially of the thrifty as well as the thriftless rural inhabitants.

HARRIS, Joseph (?-?). An English actor. His first recorded appearance was as Alphonso in

The Siege of Rhodes (1681), written by Sir William Davenant, to whose company he belonged. He also played Shakespearean rôles in the same cast as Betterton, was said to be nearly as clever in the creation of character and quite as versatile, his range extending from Romeo to Sir Frederick Frolic in *Love in a Tub*. He is mentioned in Pepys's *Diary* as a very airy gentleman, and it is also on record that he maimed a brother actor for life by fencing without a button on his foil.

HARRIS, Joseph (1828-92). An agricultural writer. He was born at Shawbury, England. A descendant of generations of farmers, he early evinced an interest in rural affairs. This led him into the study of agricultural chemistry, which he pursued with Lawes and Gilbert at Rothamsted, and which formed the basis of many of his writings. At the age of twenty-one he came to America, and in 1864 began writing for the agricultural press. He continued his work along these lines and in 1884 began a comprehensive series of articles, 171 in all, entitled "Walks and Talks on the Farm," the first of which appeared in the *Genesee Farmer*, of which he was editor, and the remainder in the *American Agriculturist*, to which the *Genesee Farmer* had been sold. Perhaps none of his other writings exercised so wide an influence in paving the way for improved farming and earned for him so high a place in American agriculture. They are actual talks with a neighbor, and not, as many suppose, with an imaginary person. Among his other writings may be mentioned his books: *Harris on the Pig* (New York, 1888); *Talks on Manures* (New York, 1883); and *Gardening for Young and Old* (New York, 1882). The last book, his final volume, is intended mainly to foster a love of plants and gardening in the hearts of a rising generation.

HARRIS, Mrs. A mythical personage, frequently mentioned in Dickens's *Martin Chuzzlewit*, by Sairey Gamp (q.v.), who uses her as an authority to give her own opinions additional force.

HARRIS, Robert (1849—). A Canadian figure and portrait painter, born in Carnarvonshire, Wales. He began his artistic career by illustrating, and then went to Europe (1877), and studied in London at the Slade School, and in Paris under Bonnat, and exhibited at the Salon and Academy. Afterwards he settled in Montreal, and became a popular portrait painter. His works include "Fathers of the Confederation" (1883) and "Meeting of the School Trustees," the first painted for and the second purchased by the Canadian Government. In 1893 he was elected president of the Royal Canadian Academy of Arts.

HARRIS, Samuel (1814-99). An American Congregational theologian, born in East Machias, Maine. He graduated at Bowdoin College in 1836, and at Andover Theological Seminary three years later. He taught, and occupied Congregational pulpits until 1855, when he was chosen professor of systematic theology in the Bangor Seminary. He was president of Bowdoin from 1867 to 1871, and then became professor of systematic theology in the Yale Divinity School. Among his publications the most important are: *The Philosophical Basis of Theism* (1883); *The Self-Revelation of God* (1887); and *God, Creator and Lord of All* (1897).

HARRIS, Thaddeus William (1795-1856). An American entomologist, born at Dorchester, Mass. He graduated at Harvard in 1815, and became a practicing physician, but devoted a great part of his time to the study of natural history. In 1831 he became librarian of Harvard. He was a member of the State Commission appointed in 1837 to make a botanical and zoölogical survey of Massachusetts, and devoted himself particularly to the preparation of a *Systematic Catalogue of the Insects of Massachusetts*. He founded the Harvard Students' Natural History Society and the Massachusetts Horticultural Society, and published a valuable report on *Insects Injurious to Vegetation* (1841; new ed. 1852).

HARRIS, Thomas Lake (1823—). An American spiritualist, born at Fenny Stratford, England. In 1827 his parents settled in Utica, N. Y. His father failed in business, and the son began to write for the press at an early age. He became a Universalist preacher at Minden, N. Y., in 1844. Soon afterwards he organized a 'Christian Society' in New York; and then embraced spiritualism, and joined a community at Mountain Cove, Va. From the common spiritualistic doctrine he soon broke away, and in 1861 organized a community, which was settled successively at Amenia and Brocton, N. Y., and then at Santa Rosa, Cal. Harris wrote: *Truth and Light in Jesus* (1860); *The Millennial Age* (1861); and an historical sketch, *The Trent Affair* (1896). On his *Brotherhood of the New Life*, consult Allen, *T. L. Harris, the Seer* (London, 1897).

HARRIS, Townsend (1804-78). The first representative of the United States in Japan. He was born at Sandy Hill, N. Y. Educated at home, he moved at the age of fourteen to New York City, and entered upon a business life as a leather-merchant. He was strict and diligent in self-culture, and much interested in popular education. While serving two terms as president of the Board of Education, he succeeded in spite of much opposition in getting established the New York Free Academy, now the College of the City of New York. In 1848 he projected and entered upon a trading and exploring voyage on the Pacific, and during the five years spent in it he gained much information in regard to Orientals and their ways. He served as consul at Ningpo in 1854, and in 1855, on the nomination of William H. Seward and Commodore Perry, he was appointed by President Pierce to be the first Consul-General to Japan, in accordance with the provisions of the treaty which Commodore Perry had made with the Shōgun's Government in 1854. On his way out he negotiated a treaty with Siam. On September 4, 1856, he raised at Shimoda the United States consular flag—the first foreign flag to float over any part of Japan. Refusing to deliver the letter of the President of the United States to the Shōgun, except in personal audience, he succeeded, after eighteen months' parleying, and entering Yedo November 30, 1857, he had audience with the Shōgun in his palace on December 7th. The next four months were spent in treaty negotiations, and after much opposition and many delays, he secured the signature of Premier Ii to a treaty which became the model for twenty subsequent

treaties between Japan and other nations. On July 7th he was made Minister Resident, and at once established his legation at Yedo. Resigning office October 21, 1861, he returned to New York and was active in many societies until his death there.

Consult: Griffis, *The First American Envoy to Japan* (Boston, 1895); and Satoh, *Agitated Japan* (London, 1896).

HARRIS, Sir William Snow (1791-1867). An English electrician, born at Plymouth and educated at Edinburgh. He practiced medicine for a few years, but after his marriage (1824) devoted himself to electricity. His system of lightning conductors for ships, patented in 1820, was introduced in the British Navy after more than twenty years' consideration. He was knighted in 1847, and in 1860 was made Government referee on electrical cases. Besides many publications on his method of fixed conductors, Harris wrote the excellent handbooks: *Electricity* (1848), *Magnetism* (1850-52), and *Galvanism* (1856); and a *Treatise on Frictional Electricity*, edited, with a biographical memoir, by Tomlinson (1867).

HARRIS, William Torrey (1835—). An American educator and philosophical writer, born at Killingly, Conn., and educated at Phillips Andover Academy and at Yale College. In 1857 he began teaching in the Saint Louis public schools, of which he was superintendent from 1867 to 1888. In 1867 he established and became editor of the *Journal of Speculative Philosophy*, the first periodical of its kind in the English language. He was received with distinction at the Paris Exposition of 1878, represented the United States Bureau of Education at the Brussels Educational Conference, and at the Paris Exposition of 1889, where he received from the French Government the honorary title 'Officier de l'Instruction Publique,' and in the same year was appointed United States Commissioner of Education. As commissioner he rendered eminent service in formulating a statement of American educational theories and in giving practical definition to pedagogic principles. He was the founder of the Saint Louis Philosophical Society, and in 1875 was president of the National Educational Association. He was a prominent member of the Concord School of Philosophy, and his writings stamp him as one of the clearest expositors in America of German philosophical thought. He received the degree of LL.D. from Yale (1895); the University of the State of Missouri (1870); the University of Pennsylvania (1894); Princeton (1896); and the University of Jena, Germany (1899). Besides voluminous reports on educational matters, many papers contributed to the *Proceedings of the American Social Science Association*, and various compilations edited by him, his publications include: *Introduction to the Study of Philosophy* (1889); *The Spiritual Sense of Dante's Divina Commedia* (1889); *Hegel's Logic: A Critical Exposition* (1890); and *Psychologic Foundations of Education* (1898).

HARRIS, William Victor (1869—). An American song composer, born in New York. He was a pupil of Charles Blumm, William Courtney, F. K. Schilling, and Anton Seidl. He was a successful organist, and from 1889 to 1895 held important appointments in Tuxedo Park, Brooklyn, and New York. He was for three years a teacher and coach at the Metropolitan Opera, New York; for one season was conductor of the Utica Choral Union, and served as assistant conductor under Seidl at the Brighton Beach summer concerts (1895-96). He afterwards took up his residence in New York, and established himself as a vocal instructor and composer. He published compositions for piano, organ, and chorus, but is principally known for his songs, which have been remarkably successful.

HARRIS BUCK. The sable antelope (q.v.), so called because discovered by Sir W. C. Harris, author of *Portraits of the Game and Wild Animals of Southern Africa*, issued in London in 1840 as a magnificent folio book, with colored plates.

HAR'RISBURG. A city and the county-seat of Saline County, Ill., 70 miles northeast of Cairo; on the Cleveland, Cincinnati, Chicago and Saint Louis Railroad (Map: Illinois, D 6). It is surrounded by an agricultural district in which are valuable mineral deposits, especially coal, and has flour and saw mills, brick-works, carriage and wagon shops, etc. Population, in 1890, 1723; in 1900, 2202.

HARRISBURG. A city, the capital of Pennsylvania, and the county-seat of Dauphin County, 105 miles west by north of Philadelphia; on the Susquehanna River, and the Pennsylvania, the Philadelphia and Reading, the Cumberland Valley, and the Northern Central railroads (Map: Pennsylvania, E 3). The river, almost a mile wide at this point, is spanned by four bridges, including two iron and steel railroad bridges and a new steel driving bridge which replaces the historic 'Old Camel-Back Bridge,' a wooden structure recently destroyed. The city has a most picturesque location, and there are a number of notable structures. The State buildings are in a beautiful park of 16 acres, the Capitol occupying a conspicuous site. The new Capitol building, the former having been destroyed by fire in 1897, is being built on a more substantial and imposing scale. The structure is of brick and steel, and will be veneered with marble or granite, and the interior finished in marble, the estimated cost being not less than $5,000,000. The State library, founded in 1790, contains over 100,000 volumes. In Capitol Park is a monument to the soldiers who fell in the Mexican War, and also, on the west side of the Capitol, a statue of Gen. John F. Hartranft. The Dauphin County Soldiers' Monument, a shaft 110 feet high in honor of the soldiers of the county who died in the Civil War, stands in State Street. Other prominent buildings besides the Capitol are the court-house, Governor's residence, State arsenal, State Insane Hospital, county prison, Grand Opera House, high school, public library, Conservatory of Music, City Hospital, Home for the Friendless, and the Children's Industrial Home. Harrisburg is the seat of a Roman Catholic bishop.

Owing to its excellent transportation facilities, both by rail and by water, Harrisburg occupies a position of considerable importance in the industrial and commercial world. It has a large trade in lumber; extensive iron and coal mines are in the vicinity; and its iron and steel interests are worthy of particular mention. There are roundhouses and repair-shops of the Penn-

sylvania Railroad; also foundries and machine-shops, tin-mills, rolling-mills, nail-works, furnaces, typewriter-works, boot and shoe factories, breweries, pipe-bending works, and extensive manufactures of beds and mattresses, women's hats, coffins, clothing, silk goods, carriages and wagons, flour, brooms, brick and tile, galvanized iron cornices, marbleized slate, and various lumber products.

The government is vested in a mayor, who holds office for three years, and is ineligible for reëlection, a bicameral council, and administrative officials, who are chosen as follows: by the executive with the consent of the select council—highway commissioner, building inspector, police department, including the chief, fire department, including the chief and assistant, and sanitary officers; by the council—solicitor, board of tax revision and appeals, three water commissioners, city engineer, city clerk, sanitary committee, three members of the board of public works, and five members of the board of park commissioners; by popular election—treasurer, controller, school directors, supervisors, and assessors (ward and city). The municipal income and expenditures amount to about $625,000 and $440,000, respectively, the principal items of expense being $15,000 for the fire department, $30,000 for operation of the water-works, $30,000 for street lighting, $35,000 for the police department, and $185,000 for schools. Public improvements have been begun (1902) involving an expenditure of $1,090,000 for the construction of a new sewer system, for filtration of water, development of parks, and street paving. Population, in 1850, 7834; in 1870, 23,104; in 1880, 30,762; in 1890, 39,385; in 1900, 50,167. Of the total population for 1900, 2500 were foreign born, and 4100 were of negro descent.

In 1726 John Harris, an English trader, settled here, and seven years later secured grants of 800 acres in this vicinity. In 1753 his son established a ferry, and the place was long known as Harris's Ferry. In 1785 a town was laid out and named Harrisburg, but in the following year it was renamed Louisburg, in honor of Louis XVI. In 1791 it was incorporated as Harrisburg; in 1812 it became the capital of the State, and in 1860 it was chartered as a city. The assembling here of the Harrisburg Convention in 1828, which was attended by representatives of the radical protectionists of New England and the Middle States, led to the passage of the high protective-tariff bill of that year. In 1839 Harrison and Tyler were nominated at Harrisburg. Consult Egle, *Centenary-Memorial of the Erection of the County of Dauphin and the Founding of Harrisburg* (Harrisburg, 1886).

HARRISON. A town and the county-seat of Boone County, Ark., 45 miles southeast of Eureka Springs; on the Saint Louis and North Arkansas Railroad (Map: Arkansas, B 1). It has a collegiate and normal institute for women, and a Government building ($75,000) in process of construction (1902). The town is in a fertile district adapted to fruit-growing, and interested in lead and zinc mining. There are several flour-mills and other industrial establishments. Population, in 1890, 1438; in 1900, 1551.

HARRISON. A city in Hudson County, N. J., on the Passaic River, and on the Pennsylvania, the Lackawanna, and the Erie railroads (Map: New Jersey, D 2). It is a suburb of Newark, with which it is connected by three steel bridges, and is the seat of the State Soldiers' Home. The city has extensive manufacturing interests, which include a large steel plant, tube-works, marine-engine works, wire-cloth factories, electric works, machine-shops, trunk and refrigerator factories, a tannery, breweries, ink-works, etc. Settled as early as 1668, Harrison was incorporated in 1873, the charter of that date being still in operation and providing for a government vested in a common council, which is elected by wards. The city owns and operates its water-works. Population, in 1890, 8338; in 1900, 10,596.

HARRISON, Benjamin (c.1740-91). An American Revolutionary patriot, one of the signers of the Declaration of Independence, born at Berkeley, Va. As a member of the Virginia House of Burgesses, in 1765, he opposed the Stamp Act Resolutions of Patrick Henry, which he considered to be impolitic and premature. From 1774 to 1777 he was one of Virginia's representatives in the Continental Congress, and was a member of many important committees, though he rendered the greatest service as president of the Board of War. From 1777 to 1782 he was Speaker of the House of Burgesses, and from 1782 to 1785—for two terms—was Governor of the State. In 1788 he was a member of the Virginia convention which ratified the Federal Constitution, though he, along with Patrick Henry and other men of prominence, opposed it—largely because of the absence of a bill of rights. He was the father of William Henry Harrison (q.v.). Consult Sanderson, *Biography of the Signers of the Declaration of Independence*, ed. by Brotherhead (Philadelphia, 1865).

HARRISON, Benjamin (1833-1901). The twenty-third President of the United States, born at North Bend, Ohio, August 20, 1833. His father, John Scott Harrison (1804-78), a son of President William Henry Harrison, represented the Whigs in Congress from 1853 to 1857. Benjamin passed his early years on his father's farm, studied two years at Farmers College, at College Hill, near Cincinnati; graduated at Miami University in 1852 as fourth in his class, and after studying law in Cincinnati, married the daughter of Rev. J. W. Scott, and settled in Indianapolis in 1854. In 1860 he was elected reporter of the Supreme Court of Indiana, and in a political debate with Thomas A. Hendricks soon afterwards acquired reputation as a speaker. He entered the Federal Army as second lieutenant in July, 1862, assisted in organizing the Seventieth Indiana Regiment, was promoted in August, 1862, to be colonel, served in Kentucky and Tennessee, led a charge at Resaca, Ga., May 15, 1864, in which one-third of his command was killed or disabled; commanded his brigade with signal bravery at Kenesaw Mountain, June 29, to July 3, 1864, and at Peachtree Creek, July 20th; took part in the operations around Nashville, and on January 23, 1865, was brevetted brigadier-general of volunteers "for ability and manifest energy and gallantry in command of brigade." Returning to civil life, he resumed his occupation of reporter of the Supreme Court, but in 1868 declined reëlection. In 1876 he was the Republican candidate for Governor of Indiana, but was defeated, though running 2000 votes ahead of his ticket. In 1878

he was appointed a member of the Mississippi River Commission. In 1880 he was elected United States Senator, taking his seat March 4, 1881, and during his term of office opposed alien ownership of large tracts of land and the Blair Educational Bill; favored civil-service reform; and was one of a committee to perfect and report a bill restricting Chinese immigration. In 1888, at the Republican Convention in Chicago, he was nominated for the Presidency, receiving 84 votes on the first ballot, 217 on the fourth, and 544 on the eighth. In the ensuing election he received 233 electoral votes to Cleveland's 168, Levi P. Morton, of New York, being elected Vice-President. His administration was marked by no especially conspicuous features; but during it the Pan-American Congress, the initiation of the policy of commercial reciprocity (q.v.), and the attempt to annex Hawaii to the United States attracted much attention. The industrial situation was much altered by the McKinley Tariff of October 1, 1890; the public debt was reduced, and a stable national currency maintained; civil-service reform was extended; the Louisiana Lottery was abolished; the condition of both the army and the navy was improved; and many highly creditable appointments to office were made, especially in the Federal judiciary. In the summer of 1892 Harrison's Secretary of State, Mr. Blaine (q.v.), resigned and became an avowed candidate for the Presidential nomination; but Harrison was again nominated, only to be defeated in the election by his predecessor, Grover Cleveland (q.v.), receiving 145 electoral votes. After leaving office he accepted a professorship of international law at the Leland Stanford University, California. During the remaining years of his life he devoted himself to the practice of law, being retained in several cases of national importance, and in 1899 appearing as counsel for Venezuela before the commission appointed to arbitrate the boundary dispute with England. He was the principal representative of the United States at The Hague Conference (1899). His death occurred after a brief illness, at Indianapolis, March 13, 1901. He wrote numerous magazine articles, made a number of able speeches on public occasions, and published *This Country of Ours* (1897), in which he gave an interesting description of the practical workings of the National Government. Another book, *Views of an Ex-President*, was published posthumously in 1901. Consult: Wilson (editor), *The Presidents of the United States* (New York, 1894); and the campaign biography by Lew Wallace, *Life of General Benjamin Harrison* (Philadelphia, 1888). For an account of Harrison's Administration, see the article UNITED STATES.

HARRISON, CARTER HENRY (1825-93). An American politician. He was born near Lexington, Ky., and, like William Henry and Benjamin Harrison, was a descendant of the Virginia Harrisons. He graduated at Yale in 1845, studied law at Transylvania University at Lexington, and after two years' travel and desultory study in Europe, returned to Kentucky to practice his profession. He soon began to take an active interest in politics, and became an opponent of disunion and the extension of slavery. In 1855 he removed to Chicago, where faith in the future of the city led him to make profitable investments in real estate. In 1871 he was elected County Commissioner of Cook County, and from 1874 to 1878 was a Democratic member of Congress. In 1879 he was chosen Mayor of Chicago, and was reëlected for biennial terms in 1881, 1883, and 1885. In 1884 he was the Democratic candidate for Governor of Illinois, but was defeated by Governor Oglesby by 14,500 votes. In 1891 he was an independent candidate for Mayor, and drew so largely from the vote of the Democratic candidate that the Republican was elected. The year 1893 was the year of the World's Fair at Chicago, and it was deemed by the business community, as well as by the reformers and promoters of the great enterprise, particularly necessary to have an able, high-minded administrator in the Mayor's office. These elements joined with the Republicans, and secured the nomination of Samuel W. Allerton, a man of acknowledged fitness. Harrison, however, after a long and bitter contest, in which there were frequent charges of fraud and intimidation, secured the Democratic nomination, and in April was triumphantly elected. He was assassinated on October 29th following, one of the closing days of the great Exposition. Although a political demagogue, Harrison differed from the modern political boss in that he relied on his personal popularity rather than machine organizations to win his victories, and despite the fact that his methods of obtaining and maintaining power were somewhat open to question, it was never charged that he himself derived pecuniary gain from his office.

His son, CARTER HENRY (1860—), was born in Chicago. He was educated at Altenburg, Germany, and at the Law School of Yale, where he graduated in 1883. He was elected Mayor of Chicago in 1897, and again in 1899.

HARRISON, CONSTANCE CARY (1846—). An American novelist, born at Vaucluse, Va. In 1867 she married Burton Harrison, a Virginia lawyer and private secretary to Jefferson Davis, and with him removed later to New York City, where she wrote many books and contributed to periodicals. Among her more noteworthy volumes of fiction are: *Golden Rod* (1880); *Helen Troy* (1881); *Bar Harbor Days* (1887); *The Anglomaniacs* (1887); *Sweet Bells Out of Tune* (1893); *A Daughter of the South* (1892); *An Errant Wooing* (1895); *A Merry Maid of Arcady and Other Stories* (1897); *A Son of the Old Dominion* (1897); *Good Americans* (1898). For children she wrote: *Old-Fashioned Fairy Book* (1884); and *Folk and Fairy Tales* (1885). Worthy of mention also is *Externals of Modern New York* (1896). Her dramatic work consists chiefly of adaptations from the French.

HARRISON, FREDERIC (1831—). An able English essayist, born in London. He was educated at King's College School, London, and at Wadham College, Oxford. He became fellow and tutor at Wadham, and was called to the bar in 1858. After practicing in the courts of equity, he was appointed a member of the royal commission upon trades unions (1867-69), secretary of the royal commission for digesting the law (1869-70), and professor of jurisprudence and international law at Lincoln's Inn Hall (1877-89). In 1889-92 he was alderman in the London County Council. In politics he supported the Liberal Party. As a philosopher he is one of the

most brilliant followers of Comte, whose ideas, much modified, he has widely diffused in essays and reviews. Among his works are: *Meaning of History* (1862; enlarged, 1894); *Order and Progress* (1875); *The Choice of Books* (1886); *Oliver Cromwell* (1888); *Annals of an Old Manor House* (1893; new ed. 1899); *Victorian Literature* (1895); *William the Silent* (1897); *The Millenary of King Alfred* (1897); *Tennyson, Ruskin, Mill, and Other Literary Estimates* (1900); *John Ruskin*, in English Men of Letters series (1902); and *Washington* (1902).

HARRISON, Gabriel (1825-1902). An American author and artist, born in Philadelphia, Pa. For several years he was an actor, and at one time supported Charles Kean. Afterwards he became the manager of several theatres, and produced, among other plays, a dramatization of Hawthorne's *Scarlet Letter* (1878). He is also the author of a *Life of John Howard Payne* (1873), and a number of critical articles, notably *Edwin Forrest, the Actor and the Man, Critical and Reminiscent* (1889). He did much for the encouragement of the free art schools in connection with the Brooklyn Academy of Design, and was also a portrait and landscape painter.

HARRISON, James Albert (1848—). An American philologist, born at Pass Christian, Miss., and educated at the University of Virginia. In 1871 he was appointed professor of Latin and modern languages in Randolph Macon College, and in 1876 was chosen professor of English in Washington and Lee University. He left this chair in 1895 to become professor of English and Romance languages at the University of Virginia. He was an editor of the *Century* and the *Standard Dictionaries;* and edited (with W. M. Baskerville) *Dictionary of Anglo-Saxon Poetry* (1883); *Library of Anglo-Saxon Poetry* (1883); *Beowulf* (1883); Mme. de Sévigné's *Letters* (1898); and Corneille's *Nicomède* (1901). Among his other works are: contributions to *Anglia* on "Negro English;" *Group of Poets and Their Haunts* (1874); *Greek Vignettes* (1877); *Spain in Profile* (1879); *Story of Greece* (1885).

HARRISON, Jane E. (1850—). An English archæologist and Hellenist, born in Yorkshire. She studied at Newnham (Cambridge) and at the British Museum, visiting also the museums of Berlin, Munich, Rome, and Athens. Since 1882 she has lectured at the British Museum, South Kensington Museum, Cambridge, and Oxford. She has received the honorary degrees of Litt.D. (Durham) and LL.D (Aberdeen). She has written: *Myths of the Odyssey* (1882); *Introductory Studies in Greek Art* (1885); *Mythology and Monuments of Ancient Athens*, with Mrs. A. W. Verrall (1890); *Greek Vase-Painting*, with D. S. MacColl (1894).

HARRISON, John (1693-1776). An English inventor, who became celebrated as 'Longitude Harrison.' He was born at Foulby in Yorkshire, where his father was the village carpenter and clock-repairer. After the most meagre education, he learned carpentering from his father, and with a natural inclination for mechanics that amounted to genius, in the intervals of his work studied the construction of clocks and watches, with a view to their improvement. His experiments resulted in the invention of the 'gridiron pendulum' for clocks, which, by an arrangement of compensating steel and brass rods, allows for the expansion caused by variations of temperature; a 'recoil escapement' to prevent the constant oiling and clogging of the pallets; and the 'going ratchet' universally used to prevent a timepiece losing while being rewound. When the British Government offered successively £10,000, £15,000, and £20,000 for the discovery of a method for determining the longitude at sea within sixty, forty, and thirty geographical miles, he made four chronometers, now in the Greenwich Royal Observatory, each with a 'compensation curb' to the balance wheel. All qualified for the first prize, the fourth, on a voyage to Barbadoes and return, determining the longitude within ten miles. After much vexatious delay and petitions to Parliament, the prize was paid to him in installments, it being stipulated that he should publish particulars of his invention *pro bono publico.* He wrote *A Description Concerning such Mechanism as Will Afford a Nice or True Mensuration of Time* (1767), and other pamphlets in connection with his discoveries. In 1897 his tomb in Hampstead Church was restored by the London Company of Clockmakers. Consult Smiles, *Men of Invention and Industry* (London, 1884).

HARRISON, Joseph, Jr. (1810-74). An American engineer, born in Philadelphia. He was conspicuously successful as a locomotive-engine builder in the early days of that industry, and in 1840 his 'Gowan and Marx' locomotive attracted the attention of two Russian engineers, who had been ordered by Emperor Nicholas to examine the systems of railroads and railroad machinery in Europe and America. As a consequence he and his partner, A. M. Eastwick, together with Thomas Winans, of Baltimore, secured a contract to build the locomotives and other machinery for the railroad from Saint Petersburg to Moscow, and later another contract, which continued until 1862, to repair the rolling stock of the railroad. On the expiration of these contracts he returned to Philadelphia, where he collected a gallery of paintings. In 1869 he published a volume containing a poem entitled *The Ironworker and King Solomon,* his autobiography, and numerous incidents of his life in Russia; and a few years later another, entitled *The Locomotive Engine, and Philadelphia's Share in Its Early Improvements* (1872).

HARRISON, (Lowell) Berge (1854—). An American genre and landscape painter, brother of Alexander Harrison. He was born in Philadelphia, November 28, 1854. He was a pupil of Carolus Duran (q.v.) and studied at the Ecole des Beaux-Arts under Cabanel. In 1881 he exhibited at the Salon; and in 1882 he returned to America, spending a year painting and sketching in New Mexico. He received a medal at the World's Fair, Chicago, 1893; and his picture entitled "November," exhibited at the Exposition of 1889, was purchased by the French Government for the Museum of Marseilles. Some of his principal works are: "Waif from the Sea," "Return from the First Communion," "Little Gooseherd," "Motherless," "Summer Idyl," "Calling Home the Cows," "Milkmaid," "Modern Pompeiian," "Friends or Foes."

HARRISON, Mary Saint Leger (pen-name Lucas Malet) (1852—). An English novelist, daughter of Charles Kingsley (q.v.). She was

born at Eversley rectory, and was educated at home and at University College, London. In 1876 she married William Harrison, a young clergyman in whom her father had been much interested, and afterwards settled at Clovelly, in Devonshire, amid the scenes of her father's boyhood. Her husband died in 1897, after which she visited the Continent, America, and India in search of health. Her popular novels of English life are written with an ethical purpose. Among them are: *Mrs. Lorimer* (1882); *The Wages of Sin* (1891); *The Carissima, a Modern Grotesque* (1896); *The Gateless Barrier*, a ghost story (1900); and *Sir Richard Calmady* (1901), a painful but powerful novel.

HARRISON, Susan Frances (pen-name Seranus) (1860—). A Canadian author, born of Irish parents at Toronto. In 1879 she married J. W. T. Harrison, an English musician and musical critic. She contributed numerous sketches, stories, and songs to newspapers and periodicals in Canada, the United States, and England. In her short stories, as *Crowded Out* (1888), she did for French Canada a work similar to that of George W. Cable for the Creoles of Louisiana. Some of her verse was collected in *Pine, Rose, and Fleur-de-Lis* (1891). She also edited a Canadian anthology entitled *The Canadian Birthday Book* (1887). Consult Stedman, *Victorian Anthology* (New York, 1895), and Rand, *Treasury of Canadian Verse* (ib., 1900).

HARRISON, Thomas (1606-60). An English regicide and religious fanatic. He was born at Newcastle-under-Lyme, Staffordshire, and although of humble parentage received a good education. He studied for the law in an attorney's office in Clifford's Inn, London, but at the opening of the Civil War in 1642 joined the regiment of life guards raised by Essex. He distinguished himself in several actions and rose to the rank of major-general. In 1646 he was elected member of Parliament for Wendover. He was in command of the escort that conveyed King Charles from Hurst Castle to London, and was one of the most energetic advocates of the King's trial and execution. In 1650, during Cromwell's absence in Ireland, he was commander-in-chief of the military forces in England, and the following year was elected a member of the Council of State, to which he had been nominated two years previously. His connection with the Fifth Monarchy Men (q.v.) and his conspiracies against Cromwell resulted in imprisonment and the loss of his commission and offices. At the Restoration he refused to save himself by flight, and as one of the seven regicides excluded from the Act of Indemnity was arrested and condemned to death. Justifying his actions and bearing himself bravely on the scaffold, he was executed on October 13, 1660.

HARRISON, (Thomas) Alexander (1853—). An American genre and landscape painter. He was born in Philadelphia, January 17, 1853. He was a pupil of Gérôme (q.v.), at the Ecole des Beaux-Arts, and has been strongly influenced by the works of Cazin and Bernard. His work is characterized by grace of line and by luminous color, delicate in its effect. He is especially noted for his marines, which are rendered with broad surfaces that well express the transparency of the ever-changing color of water and sky. He received medals at the exhibition of the Pennsylvania Academy of Fine Arts in 1887; a gold medal at the Paris Exposition in 1889; the second medal of honor at Brussels and Ghent in 1891; the gold medal of honor at Pennsylvania Academy of Fine Arts in 1894.

His chief works are as follows: In 1881, "Au Bords de la Mer," "Shipwrecked," "Coast of Brittany"; 1882, "Chateaux en Espagne" (Castles in Spain); 1883, "The Amateurs," "Little Slave"; 1884, "Breton Garden," "Twilight," "Seashore"; 1885, "The Wave." He exhibited at Buffalo in 1901, "The Golden Mirror," "Le Crepuscule" (Twilight), "Autumn," "Child with Doll" He was made Chevalier of the Legion of Honor and Officer of Public Instruction by the French Government; is a member of the Society of American Artists, New York; of the Royal Institute of Painters in Oil Colors, London, and a corresponding member of the Societies of Secessionists, Berlin and Munich.

HARRISON, William (1534-93). An English divine and historian, born in London. He was educated in the Saint Paul and Westminster schools, took art courses at Oxford and divinity at Cambridge, became chaplain to Lord Cobham of Kent, and afterwards rector of Radwinter, Essex. He was also canon at Windsor, where he died; but he is most widely known by his work in the *Chronicles* of Holinshed, the source whence Shakespeare drew the material for his historical plays. Harrison's share therein is invaluable for the local color of the sixteenth century, being *An Historicall description of the Iland of Britaine, with a brief rehersall of the nature and qualities of the people of England and such commodities as are to be found in the same comprehended in three books and written by W. H.* The New Shakespeare Society brought out a modern edition of this work in 1877-81.

HARRISON, William Henry (1773-1841). Ninth President of the United States. He was the son of Benjamin Harrison (1740-91); was born at Berkeley, Charles City County, Va., February 9, 1773; was educated at Hampden-Sidney College, and although the profession of medicine had been chosen for him, entered the army as an ensign in 1791, became a lieutenant in June, 1792, and served against the Indians as an aide-de-camp on the staff of General Wayne, taking part in the battle of the Maumee and in other engagements, and becoming a captain in May, 1797. Resigning in June, 1798, he was soon afterwards appointed Secretary of the Northwest Territory under Gen. Arthur Saint Clair, but in October, 1799, resigned that position to become a Territorial Delegate in Congress. In 1801 he was made Governor of the so-called Indiana Territory, which then comprised the region later embraced in the States of Indiana, Illinois, Michigan, and Wisconsin, and for a time subsequent to the treaty of 1803 his jurisdiction also extended over that part of the lands then acquired from France by the Louisiana Purchase (q.v.), which was known as the District of Louisiana. Harrison's executive work in the Northwest continued until 1813, and was marked by conspicuous success in a variety of difficult undertakings, in which he secured the hearty appreciation of the people affected by his administration and the marked approval of the National Government. He was largely instrumental in effecting a change of the organization of Indiana from a Federal district to a Territory with representative government and

with a Delegate in Congress, although by this arrangement his own power was appreciably diminished. He rendered effective and important service to the nation by early establishing friendly relations with a number of the Indian tribes, and by thus lessening the possibility of a continuation of British influence in that region. On September 17, 1802, he concluded a treaty at Vincennes, and in July of the following year negotiated the more important treaty of Fort Wayne. But while in some regions the questions of land rights and the allied problems arising from the ill-defined relations between the tribes and the newly organized government were being adjusted amicably, Harrison's force and ability were also tested by the necessity of meeting successfully conditions which required the use of arms. In this branch of the public service he was also active, his most important military campaign being that against Tecumseh's brother, the Prophet, in the region of the Wabash, culminating in his victory at the battle of Tippecanoe (q.v.), November 7, 1811. Upon the outbreak of the War of 1812 he became a major-general of Kentucky militia, and in August, 1812, was made a brigadier-general in the Regular Army, and soon afterwards was appointed to the chief command in the Northwest, in which capacity, with the rank, after March, 1813, of major-general, he was actively engaged during the Western campaigns of the war, becoming again conspicuous by his brave defense of Fort Meigs (q.v.) and by his complete victory over the British at the battle of the Thames, October 5, 1813. Harrison had thus repeatedly shown marked military talent, and the end of the war left him, next to Jackson, the most prominent military figure in American public life. Withdrawing, however, from the army, Harrison entered Congress as the representative of the district embracing Cincinnati, and served from 1816 to 1819, when he was elected to the State Senate, where he remained until 1821. In 1825 he returned to Washington as Senator from Ohio, retaining this position until 1828, when he was sent as Minister to Colombia. Upon returning from that post in the following year, he retired for several years from public life. In 1835 he was nominated for the Presidency by Whig conventions in Indiana, Ohio, and Maryland, and by an Anti-Masonic convention at Harrisburg, Pa., and in the ensuing election succeeded in carrying seven States, Vermont, New Jersey, Delaware, Maryland, Kentucky, Ohio, and Indiana, securing 73 electoral votes, as against 170 given to Van Buren and 51 divided among the three other candidates. Moreover, the popular vote for Harrison in Connecticut, Rhode Island, and Pennsylvania approached very closely, and in Illinois and New York compared favorably with, that of Van Buren. When, finally, the financial policy of Jackson and Van Buren brought such disastrous results as to turn against the Administration a large portion of the people, the situation became particularly favorable for whoever might be nominated by the Whig Party in 1840. Although in many respects Henry Clay appeared as the leader of the party, he could not command its complete support as a Presidential candidate, and, accordingly, in the interest of harmony, he refrained from an active contest and left Harrison as the leading candidate for the nomination. The Whig Convention met at Harrisburg, December 4, 1839, and comprised 254 delegates. The 'unit rule' was introduced, and upon the first ballot Henry Clay received 103 votes, General Harrison 94, and General Scott 57. On the fifth ballot, during the third day of the convention, Harrison received 148 votes, Clay 90, and Scott 16, and Harrison was accordingly declared the nominee of the party. There forthwith began a political campaign which for popular enthusiasm and widespread activity has probably never been equaled in American politics. Throughout the country, meetings, processions, and a great variety of 'demonstrations' were held, and the general public took an energetic share in the contest. New campaign methods were introduced, and the log cabin and hard cider became especial emblems of the party of 'Tippecanoe and Tyler too.' The 'stump speaker' was a prominent feature of this new method of campaigning, even General Harrison himself making a series of addresses. The early State elections in some of the New England States and in Ohio and Kentucky resulted in Whig victories, and in the Presidential election Van Buren carried only seven States, of which but two were Northern States, with a total electoral vote of only 60, as against the 234 votes secured by Harrison. Although in good health at the time of his inauguration, General Harrison was taken ill, and died on April 4, 1841, the whole political situation being thus suddenly altered, and the Whig President being succeeded by John Tyler (q.v.), a former Democrat. William H. Harrison was the grandfather of President Benjamin Harrison. *A Historical Narrative* of Harrison's services was prepared by Moses Dawson (Cincinnati, 1824), a *Memoir* was written by James Hall (Philadelphia, 1836), and campaign biographies by C. S. Todd, S. J. Burr, Richard Hildreth, and I. R. Jackson were issued in 1840; but there is no adequate biography. Consult the sketch by Bostwick, in Wilson, *Presidents of the United States* (New York, 1894).

HAR'RISONBURG. A town and the county-seat of Rockingham County, Va., 122 miles northwest of Richmond; on the Baltimore and Ohio, the Chesapeake and Western, and the Southern railroads (Map: Virginia, F 3). It is in the picturesque and fertile Shenandoah Valley, is of considerable importance as the commercial centre for this agricultural region, and has foundries and machine-shops, potteries, stave and heading works, saw and planing mills, flouring-mills, etc. The water-works are owned by the municipality. Population, in 1890, 2792; in 1900, 3521.

HAR'RISONVILLE. A city and the county-seat of Cass County, Mo., 45 miles south by east of Kansas City; on the Missouri Pacific, the Missouri, Kansas and Texas, and other railroads (Map: Missouri, B 3). It has a county building that cost $50,000 and a public school library. There are some manufactures, and considerable trade in grain, agricultural produce, live stock, lumber, etc. Population, in 1890, 1645; in 1900, 1844.

HARRISSE, à'rês', Henry (1830—). A French bibliographer and historian, born in Paris, of Russian-Hebrew parentage. Through long years of investigation in the archives of different European countries, he was enabled to collect material for such works as *Bibliotheca Americana Vetustissima* (1866), a bibliography

of publications about America from 1492 to 1551, invaluable to modern students of that period. M. Harrisse prepared perhaps the best biography yet published of Columbus, made a uniquely important collection of the early maps of America, and while shut up in Paris during the siege of 1870 compiled *Notes pour servir à l'histoire, à la bibliographie et à la cartographie de la Nouvelle-France et des pays adjacents* (1872). He published also *Fernand Colomb, sa vie et ses œuvres* (1872); *Les Colombs de France et d'Italie* (1874); *Christophe Colomb, son origine, sa vie, ses voyages, sa famille* (1884-85); *Jean et Sébastien Cabot* (1882); *Les Corte-Real* (1883); *Excerpta Colombiniana* (1887); *Découverte de l'Amérique du Nord* (1892); *Autographes de Christophe Colomb* (1893); *Découverte de Terre-Neuve* (1900).

HAR'RODSBURG. A city and the county-seat of Mercer County, Ky., 30 miles south of Frankfort; on a branch of the Southern Railway (Map: Kentucky, G 3). It is a summer resort, visited for its mineral springs, and has a public library and Beaumont College for women, opened in 1894. There are a large distillery, flour-mills, planing-mills, and other industrial establishments. Under a general law of 1894 the government is vested in a mayor, elected every four years, and a municipal council. Population, in 1890, 3230; in 1900, 2876. Harrodsburg was founded in June, 1774, by James Harrod, and is the oldest permanent settlement in the State. In 1776, when Kentucky was organized as a county of Virginia, Harrodsburg became the county-seat. It was incorporated in 1875. Consult an article, "Kentucky's Pioneer Town," *New England Magazine*, vol. xiii. (Boston, 1891).

HAR'ROGATE. A fashionable inland watering-place and municipal borough in the West Riding of Yorkshire, England, 19 miles west of York (Map: England, E 3). Its importance dates from the discovery of its chalybeate, sulphur, and saline springs in 1596. The town consists of High and Low Harrogate, connected by rows of handsome residences encircling a public park of 200 acres. The royal baths and springs, with their fine buildings, the electric lighting plant, water-works, markets, and a remunerative sewage farm are the property of the municipality, which maintains a free library, the Royal Spa concert rooms and gardens, a kursaal, winter garden, theatre, and recreation grounds. Population, in 1891, 15,700; in 1901, 28,400. Consult Grainge, *History of Harrogate* (London, 1882).

HARROW. See HARROW-ON-THE-HILL.

HARROW (AS. *hearge*, Dutch *hark;* connected also with Icel. *herfi*, harrow; possibly akin to Skt. *kharj*, to scratch). An agricultural implement, used for smoothing and pulverizing plowed land and for covering seeds previously sown. It consists of a frame of a square or rhombic form, in which are fixed rows of teeth, or tines, projecting downward. The harrow was in use before the dawn of history; but since only the lighter soils were cultivated in ancient times, it often consisted of bushes, or branches of trees, which merely scratched the ground. In the various stages of its development the harrow has consisted of a wooden frame with wooden teeth, a wooden frame with iron teeth, or wholly of iron. The second is still used to a considerable extent, but iron harrows are most commonly employed. Of a very different character from those mentioned above are the chain harrows, which consist of a congeries of iron rings, and the disk harrows, which pulverize the soil by means of a series of obliquely set revolving disks.

HAR'ROWBY, DUDLEY FRANCIS STUART RYDER, Earl of (1831—). An English politician, born at Brighton. He was educated at Harrow and Oxford, and took an Eastern sojourn, followed by military service at home during the Crimean War, but entered Parliament in 1856, and while Viscount Sandon was three times member for Liverpool. He succeeded to his father's title in 1882, and became prominent in matters relating to education and social reform brought before the House of Commons. Under the Conservative Government he held such offices as president of the Board of Trade (1878-80), and Lord Privy Seal (1885-86).

HAR'ROW-ON-THE-HILL. A town in Middlesex, England, 12 miles northwest of London. Its celebrity is derived from its famous school, Harrow. The town is finely situated on a hill 200 feet high, which is conspicuously crowned by the archæologically interesting Church of Saint Mary with its lofty spire. This church, founded by Archbishop Lanfranc in the reign of William I., was rebuilt in the fourteenth century, and has a view of thirteen shires. Population, in 1891, 6200; in 1901, 10,200. Consult: Rimmer, *Rambles Round Eton and Harrow* (London, 1882); Bushell, *The Harrow Octocentenary Tracts* (Cambridge, 1894).

HARROW SCHOOL. One of the great public schools of England, founded in 1571 by John Lyon (q.v.). Its charter was granted by Elizabeth in the same year, and in 1590 the laws to govern its operation were duly framed by Lyon himself, but students were not admitted until the opening of the first building in 1611. Originally intended for the education of thirty poor youth from the parish of Harrow-on-the-Hill, its statutes nevertheless provided for the admission of "so many foreigners over and above the youth of the parish as the whole number may be well taught and the place can contain." The founder bequeathed two-thirds of his property for its maintenance, but the school did not thrive until 1660, when the headmaster availed himself of the statute admitting such as lived beyond the parish. This act assured its prosperity, though the enrollment has at times been very low. Now there are more than six hundred in attendance. Long purely classical, the curriculum was extended by the introduction of mathematics in 1837, of modern languages in 1851, of English history and literature in 1869, and subsequently of drawing, music, and science. The school was formerly administered by six prominent parishioners, themselves empowered to fill any vacancies, but by the Public Schools Act of 1868, though the survivors of the old board remained, an additional six were elected, severally, by the Lord Chancellor, the universities of Cambridge, London, and Oxford, the Royal Society, and the under-masters. Students are admitted at the age of twelve to fourteen. Though free tuition was originally intended, there is now no gratuitous instruction, but the foundationers have some slight advantage of the foreigners in rates. There are about six entrance

scholarships varying from £30 to £80, and the best of the exhibitions are the three by Baring, of a value of £100 each for five years, to Hertford College, Oxford. To the first building have been added a chapel (1839, replaced by another in 1857), the Vaughan Memorial Library (1861-63), and the hospital (1865). The Tercentenary Lyon Fund has provided a gymnasium, laboratories, and a new speech-room (1877). Among the names associated with Harrow the most noteworthy are James Bruce, the African traveler, Charles Buller, Colonel Burnaby, Byron, Calverley, Theodore Hook, Sir William Jones, Cardinal Manning, Merivale, Palmerston, Dr. Parr, Sheridan, Archbishop Trench, Anthony Trollope, and Sir George Trevelyan. Consult: Rimmer, *Rambles Round Eton and Harrow* (London, 1882); Thornton, *Harrow School and Its Surroundings* (ib., 1885); *Harrow School Register, 1801-93* (ib., 1894); Minchin, *Old Harrow Days* (ib., 1898); and Williams, *Harrow* (ib., 1901).

HARRY AL'LIS. The pseudonym of the French author Jules Hippolyte Percher.

HARRY, BLIND. See HENRY THE MINSTREL.

HARRY LOR'REQUER. Charles Lever's first novel, and one of his most successful works. It appeared in the *Dublin University Magazine*, and was published in 1840. It is a rollicking tale of adventure.

HARSDÖRFER, härs'dēr-fēr, GEORG PHILIPP (1607-58). A German poet and scholar. He studied law at Altdorf and Strassburg, and, in 1644, with Johann Klaj, founded at Nuremberg a poetical society called the *Pegnitzorden*. He was a prolific writer, publishing about fifty volumes in German and Latin. His style is ornate and artificial; his material shows strong influence of Italian and Spanish literature. He made a strong effort to purify his native tongue. His works include: *Frauenzimmergesprächspiele* (second edition, 1642-49), a sort of encyclopædia in dialogue of curious knowledge; *Nathan, Jotham, und Simson*, a collection of fables and allegories; and *Poetischer Trichter, die deutsche Dicht- und Reimkunst, ohne Behuf der lateinischen Sprache in sechs Stunden einzugiessen* (1647-50). Selections from his poems are in Müller, *Bibliothek deutscher Dichter des 17. Jahrhunderts* (Leipzig, 1826).

HAR'SHA, or **SRĪ-HARSHA-DEVA.** The name of a renowned King of India, known also as Harsha-vardhana, or Harsha-Sīlāditya. He reigned over Thaneuar and Kansnj (A.D. 606-648), and was monarch of all Northern India, as we know from the Chinese pilgrim Hiouen Thsang (q.v.). He was a noted patron of literature, and is named as the author of three Sanskrit dramas: the *Ratnāvalī*, or Pearl Necklace; the *Priyadarśikā*, or Lost Princess; and a play with a Buddhist plot, the *Nāgānanda*, or Joy of Serpents. The question of his actual authorship has often been discussed. It was under his royal favor that Bāna wrote the historical romance *Harsha-carita*, or *Adventures of Harsha*, translated into English by Cowell and Thomas (London, 1897). There are English, French, and German translations of the three dramas: *Ratnāvalī*, by Wilson (London, 1871) and Fritze (Chemnitz, 1878); *Priyadarśikā*, by Strehly (Paris, 1888); *Nāgānanda*, by Boyd (London, 1872) and Bergaigne (Paris, 1879). Consult also: S. Lévi, *Théâtre Indien* (Paris, 1890); Lévi, *Une poésie inconnue du roi Harsha Çīlāditya* (Leyden, 1895); Jackson, "Time Analysis of Harsha's Play," in the *Journal of the American Oriental Society*, xxi. (New Haven, 1901).

HARS'NETT, SAMUEL (1561-1631). An English ecclesiastic, Archbishop of York. Born in the parish of Saint Botolph, Colchester, Essex, he was educated at Cambridge, and began his career as a preacher in 1584, with a sermon at Saint Paul's Cross, London, directed so strongly against the doctrine of predestination that he was then and afterwards accused of leaning toward Popery. He was archdeacon at Essex from 1602 until 1604, and the following year was made master of Pembroke Hall, Cambridge, Bishop of Chichester (1609), and of Norwich (1619). He was undoubtedly an extreme high churchman, most arbitrary in his dealings with the subordinate clergy and Puritan laity, but when summoned to appear before the House of Lords and refute the charges of Romanism brought against him, his defense was so eminently satisfactory that he was made Archbishop of York (1628). He is the author of *A Discovery of the Fraudulent Practices of John Darrell* (1599), and *Declaration of Egregious Popish Impostures*, etc. (1603).

HART (AS. *heort, heorot*, OHG. *hiruz, hirz*, Ger. *Hirsch*, hart; connected with Lat. *cervus*, Welsh *carw*, Lith. *kárve*, stag, OChurch Slav. *krava*, cow, Gk. κεραός, *keraos*, horned; also related to Lat. *cornu*, Ir., Welsh *corn*, Galatian κάρνον, *karnon*, horn, and to Gk. κέρας, *keras*, Skt. *sṛnga*, horn). A stag or male of the red deer, from the age of six years, when the crown or *surroyal* of the antler begins to appear. Great importance was formerly attached to the distinction of names proper to deer at different ages. See ANTLER; DEER.

HART, ALBERT BUSHNELL (1854—). An American historian, born at Clarkesville, Mercer County, Pa. He prepared for college in Cleveland, Ohio, and in 1880 graduated at Harvard. He continued his historical studies in Paris, at the Ecole des Sciences Politiques, at the University of Berlin, and at the University of Freiburg, where he received his Ph.D. degree in 1883. In the fall of that year he returned to America to accept an appointment as an instructor in history at Harvard, and a year later became an assistant professor. In 1897 he was appointed a full professor. He has been particularly identified with the introduction and development of the method of studying history from the original sources, both in secondary schools and in colleges, and his influence has been felt, not only at Harvard, but in other universities as well. He is an editor of the *Harvard Graduates' Magazine* and the *American Historical Review*, and has been a frequent contributor to magazines and reviews. He has published: *Introduction to the Study of Federal Government* (1890); *Epoch Maps, Illustrating American History* (1891); *Formation of the Union* (1892, in "Epoch Series"); *Practical Essays on American Government* (1893); *Studies in American Education* (1895); *Revised Suggestions on the Study of History and Government of the United States* (1895); *Guide to the Study of American History* (with Edward Channing) (1897); *American History Told by Contemporaries* (4 vols., 1898-

1901); *Source Book of American History* (1899); *Life of Salmon P. Chase* (1899, in the "American Statesmen Series"); *Foundations of American Foreign Policy* (1901). He was a member of the committee of seven of the American Historical Association, appointed to consider the subject of history teaching in the secondary schools, and was one of the authors of their *Report* (1899). In 1902 he was chosen editor-in-chief of the coöperative history of the United States projected under the auspices of the American Historical Association.

HART, Charles Henry (1847—). An American author, born in Philadelphia. He was admitted to the bar in 1868, and graduated at the University of Pennsylvania the next spring. He practiced law until 1894, when he met with an accident, after which he gave his attention entirely to literature. In 1884 he was elected director of the Pennsylvania Academy of Fine Arts, and afterwards chairman of the committee on retrospective American art at the World's Columbian Exposition (1893). His publications include: *Bibliographia Lincolniana,* reprinted under the title *Biographical Sketch of Abraham Lincoln* (1870); *Life Portraits of Great Americans; Gilbert Stuart's Portraits of Women;* and *Engraved Portraits of Washington.*

HART, Ernest Abraham (1835-98). An English physician and reformer, born of Jewish parentage at Knightsbridge, London. He became a student at Saint George's Hospital, receiving part of his medical education at Lane's School of Medicine in Grosvenor Place, where he was appointed a demonstrator in his third year. He was admitted to the Royal College of Surgeons in 1856, and was house surgeon at Saint Mary's Hospital after being associated with William Coulson in general practice. In 1860 he became surgeon to the West London Hospital, but returned to Saint Mary's in 1863 first as ophthalmic, then as aural surgeon, and finally as dean of the medical school.

In 1863 he became coeditor of the London *Lancet,* and in 1866 he was made the editor of the *British Medical Journal,* a position which he filled until his death. He also edited the *Medical Record* from 1873, and the *Sanitary Record* from 1874. He was president of the Harveian Society of London in 1868 and 1893. Hart was above all a reformer. In 1854 he led the agitation which compelled the Admiralty to remove naval assistant surgeons from the cockpit to more fitting quarters; in 1888 he made strenuous efforts to ameliorate the position of military medical officers; and in 1892 he called attention to the grievances of Irish dispensary doctors. Sanitary reforms occupied him throughout all his life. His earliest sanitary investigations were carried out in connection with the *Lancet* commission for the nursing of the sick poor in the Metropolitan Workhouse infirmaries. His exposure in 1872 of the evils of the system of baby-farming was instrumental in leading to the passage of an act for the protection of infant life. Coffee-taverns, the National Health Society, and the abatement of the smoke nuisance in large towns had his strong support. In 1894 he engaged in a campaign against the system of barrack schools, where hundreds of pauper children herded together till they became subject to chronic diseases, and were drilled until they were little better than automata.

His most important publications include: *On Diphtheria* (London, 1859); *On Some of the Forms of Diseases of the Eye* (London, 1864); *A Manual of Public Health* (London, 1874); *Hypnotism, Mesmerism, and the New Witchcraft* (London, 1893 and 1896); *Essays on State Medicine* (London, 1894). He also originated the series of biographies known as *Masters of Medicine.*

HART, James McDougal (1828—). An American landscape painter. He was born at Kilmarnock, Ayrshire, Scotland, May 10, 1828, and came to America in 1831. He was a pupil of his brother, William Hart, also of Schirmer, at Düsseldorf, in 1851. He established a studio in New York, and was elected member of the National Academy in 1859. His favorite subjects are American forests with autumnal effects. Among his principal works are: "On the Croton;" "Summer on the Bouquet River;" "Morning in the Adirondacks;" "Summer Memory of Berkshire;" "Adirondacks" (1858), Walters Collection, Baltimore; "Through Dust Clouds" (1879); "Princess Lily" (1882); "Boughs for Christmas;" "In the Old Orchard;" "Oaks in Autumn;" "Landscape with Cattle," Metropolitan Museum, New York.

HART, James Morgan (1839—). An American scholar and educator, born at Princeton, N. J. He studied at Princeton University, where he graduated in 1860, and further at Göttingen, Germany; was assistant professor of modern languages at Cornell from 1868 to 1872, and at the University of Cincinnati, Ohio, held the chair of modern languages and English literature in 1876-90. In the latter year he returned to Cornell as professor of rhetoric and English philology. His publications include translations from the German and French; very serviceable editions, with brief notes, of Goethe's *Hermann und Dorothea* (1875) and *Faust* (part i. 1876), and Schiller's *Piccolomini* (1875); an informing and interesting work on *German Universities* (1874); and a *Handbook of English Composition* (1895).

HART, Joel (1810-77). An American sculptor. He was born in Clark County, Ky. He received but little education, and at the age of twenty he worked with a stone-cutter. The talent which he displayed in clay-modeling attracted attention, as did especially his marble bust of Cassius M. Clay, and in 1849 he went to Florence to execute a commission for a statue of Henry Clay, given him by the Ladies' Clay Association of Virginia. His first model was lost during the voyage by shipwreck, and the statue itself, which is now in Richmond, Va., was not completed till 1859. Hart executed two other statues of the same statesman—one of marble, in the court-house at Louisville, Ky., and a colossal bronze statue at New Orleans. He resided at Florence, producing many statues and busts. The most important of these are: "Angelina," "Il Penseroso," and "Woman Triumphant." He also invented a mechanical device for obtaining the outlines of a head from life, the application of which gave some vogue to his portrait busts. He died at Florence, Italy, March 2, 1877.

HART, John (1708-80). A signer of the Declaration of Independence, born in New Jersey.

His father raised and commanded the company known as 'The Jersey Blues,' which he led to Quebec just in time to share in Wolfe's victory. John took an active part in the pre-Revolutionary agitation, and was several times elected to the Provincial Legislature. In 1776 he was elected to the Continental Congress. During the British invasion of New Jersey his farm was ravaged, and he himself became a fugitive until the battle of Trenton, when the British withdrew and he was able to return to his home.

HART, John Seeley (1810-77). An American educator. He was born in Stockbridge, Mass.; graduated at Princeton in 1830, and four years later became adjunct professor of ancient languages there. From 1836 to 1841 he was in charge of the Edge Hill School, Princeton. He was principal of the Philadelphia High School from 1842 to 1859, and of the New Jersey State Normal School from 1863 to 1871. In 1872 he became professor of rhetoric and the English language at Princeton. He founded the *Sunday-School Times* in 1859, and edited it until 1871, and for a time edited the publications of the Sunday-School Union. He also prepared several text-books, including a *Manual of Composition and Rhetoric* (1870); *Manual of English Literature* (1872); and a *Manual of American Literature* (1873).

HART, Julius (1859—). A German author. He was born at Münster, and was educated at Berlin. In addition to translations from English, American, Spanish, and Persian poets, his publications include: *Sansara*, poems (2d ed. 1887); *Homo Sum*, poems (1888); *Don Juan Tenorio*, a lyrical tragedy (1881); *Der Sumpf*, a tragedy (1885); *Geschichte der Weltlitteratur und des Theaters* (1894-96). The last-mentioned work is profusely illustrated, and embraces the history of literature from its earliest beginning to the present day.

HART, Sir Robert (1835—). An Englishman, inspector-general, and director of the Chinese Imperial Customs Service. He was born at Portadown, Armagh, Ireland; was educated at Queen's College, Belfast, where he graduated in 1854, and in the same year entered the British consular service in China. In 1858 he was secretary to the Commission of the Allies at Canton, and in the following year entered the Chinese Maritime Customs service as a deputy commissioner. Advanced in 1863 to the post of Inspector-General, he reorganized the service practically on the lines on which it is now administered. He also organized and maintains in connection with the service a large fleet of steamers for the suppression of piracy and smuggling, and established a splendid system of lighting the coast. A fine postal system, which is now being extended to all parts of the country, was also inaugurated by him. In 1885, when Sir Harry Parkes, British Minister at Peking, died, Sir Robert was asked to succeed him; but, yielding to the entreaties of the Empress Dowager, he declined. He received the highest honors from the Chinese Government, among them the Red Button, and the decorations of the Double Dragon and the Peacock's Feather. His ancestors have been ennobled for three generations, and after the settlement of the Boxer troubles he was appointed to high office in the Imperial Government, and the whole Customs Department, native and foreign, was placed under his control. He was also decorated by all the European governments; was made a C.M.G. by the British Government in 1880, K.C.M.G. in 1882, G.C.M.G. in 1889, and in 1893 was created a baronet. In 1900 he had about 5000 men under his control, of whom about 900 were foreigners, all chosen and governed in accordance with the strictest civil-service rules. He was with the other foreigners in the British Legation when it was besieged by the Boxers and the Imperial troops.

HART, Samuel (1845—). An American clergyman, born at Saybrook, Conn. He graduated at Trinity College in 1866; after 1868 taught at that institution, and was made professor of Latin in 1883. He was ordained priest of the Protestant Episcopal Church in 1870, and in 1893 he was elected Bishop of Vermont, but declined the office. In 1886 he became custodian of the *Standard Prayer-Book* of his Church, and in 1892 secretary of the House of Bishops. In 1899 he became vice-dean and professor of doctrinal theology and the Prayer-Book at the Berkeley Divinity School. His publications include editions of Juvenal (1873), of Persius (1875), and of Bishop Seabury's *Communion Office* (1874), and *Historical Sermons of Bishop Seabury* (1883-86).

HART, Solomon Alexander (1806-81). An English painter, of Jewish origin. He was born at Plymouth, Devonshire. He studied at the Royal Academy, London, and exhibited his first oil picture, "Instruction," in 1828. In 1830 he exhibited the "Elevation of the Law," originally called the "Interior of a Polish Synagogue," which brought him reputation, and is now in the National Gallery. Among his other works are: "Isaac of York in the Donjon of Front-de-Bœuf" (1830); "English Nobility Privately Receiving the Catholic Communion" (1831); "Lady Jane Grey on Tower Hill;" "Milton Visiting Galileo in Prison" (1847); and "The Three Inventors of Printing" (1852). In 1835 Hart became an associate; in 1840, an Academician; in 1854 professor of painting in, and in 1865 librarian of, the Royal Academy. His last paintings show decline. He died in London, June 11, 1881. Consult his *Reminiscences* (London, 1882).

HART, William (1823-94). An American landscape and animal painter, born in Paisley, Scotland, March 31, 1823. He came to New York in early youth, and was apprenticed to a coach-maker, for whom he painted carriage decorations. He was self-taught, and first exhibited at the National Academy in 1848. His work being favorably received, he went to Scotland in 1849, studying and painting for three years; on his return to New York he opened a studio, and was elected a member of the National Academy in 1858. In 1865 he was elected president of the Brooklyn Academy of Design, and he was also president of the American Society of Water-Colorists from 1870 to 1873. He died at Mount Vernon, New York, June 17, 1894. Among his principal works are: "Peace and Plenty" (1855); "Close of Day," Mount Desert (1856); "Lake in the Hills" (1858); "White Mountains," owned by C. B. Warren, Philadelphia; "Joy of Autumn" (1865); "Golden Hour" (1872); "Morning in the Mountains" (1874); "Keene Valley" (1875); "Jersey

Cattle" (1879); "Hillside Pasture" (1880); "Landscape and Cattle;" "Path by the River;" "Group of Cattle;" "After a Shower."

HARTBEEST (Boer Dutch *hartebeest*, hartbeast, from *harte*, Dutch *hart*, hart + *beest*, beast). A large antelope of South Africa, the type of a genus (Bubalis or Alcelaphus) containing several similar species, all African except one, the titel (see BUBALIS), which also inhabits Arabia and Syria. The genus is characterized by its long, pointed head terminating in a narrow muzzle, ringed, compressed, and often lyrate horns, and a comparatively short, cow-like tail. As is the case with most antelopes of the plains, the fore quarters are heavy and higher than the hind quarters, which are narrow and drooping. The reverse is the case with the bushbucks and others inhabiting a bushy or forested country.

The typical or common hartbeest (*Bubalis cama*) formerly ranged from Cape Colony to Mashonaland, and gathered in great herds; but it has been slaughtered until now it is found only in remote regions. It stands about four feet high at the withers, and is grayish-brown, with a yellowish patch on the buttocks and black markings on the face. The heavily ringed, divergent horns are bent sharply back at the tips. The animal was noted among hunters as one of the swiftest of African antelopes, and easily distanced greyhounds. Near the Victoria Nyanza lives a similar but pale-faced species (*Bubalis Jacksoni*). German and British East Africa and Western Abyssinia are the home of three reddish species, having widely expanding horns, and these are still fairly numerous there on the bushy plains. One is the red or Cooke's hartbeest (*Bubalis Cookei*), another the tora (*Bubalis tora*), and the third Swayne's, or the 'sig' (*Bubalis Swaynei*). Sir H. Johnston found the first-named extremely numerous in the plains about Kilimanjaro in 1885.

The konzi (*Bubalis Lichtensteini*) of all the Zambezi region and Nyassaland; Hunter's hartbeest (*Bubalis Hunteri*) of the Tana River Valley, marked with a conspicuous white chevron on the forehead; the black-faced korrigum (*Bubalis Senegalensis*) of the whole Sudan; and the large Tunisian hartbeest (*Bubalis major*) of the western Sahara, are allied species of the North. In South Africa there formerly ranged in great herds, and still sparingly exist, three other well-known species. One, the sassaby, or bastard hartbeest (*Bubalis lunata*), was one of the most numerous and well-known antelopes of the plains of Cape Colony and northward; it is about three feet ten inches high, and dark purplish red, nearly black on the face and along the spine. Like all of this group, their flesh is excellent food. The blesbok (*Bubalis albifrons*) and bontebok (*Bubalis pygargus*) are smaller, and remarkable for their brilliant purple-red color and white legs, and each has a white blaze on the face. In the bontebok this mark continues to the base of the horns, while in the blesbok it is divided by a dark cross-bar between the eyes. See ANTELOPE; and Plate of ANTELOPES.

HART'-DYKE', Sir WILLIAM (1837—). An English landowner and politician, born in Kent. He was educated at Harrow and Oxford, was elected to Parliament for his native shire in 1865, was Chief Secretary for Ireland (1885-86), and vice-president of the Council on Education (1887-92).

HARTE, FRANCIS BRET (1839-1902). An American humorous poet and novelist, born at Albany, N. Y., August 25, 1839. At fifteen he wandered to California, where he spent three years digging for gold and teaching school. In 1857 he entered the office of the *Golden Era* as a compositor, and presently began to write for that paper sketches which attracted favorable notice. He became its assistant editor, and soon afterwards editor-in-chief of the *Weekly Californian*, in which he published his parodies of novels. Meanwhile, from 1864 to 1867, he was secretary of the United States Mint in San Francisco, and was writing for newspapers poems that won him great popularity, e.g. "The Society upon the Stanislaus." His first book of verse, *The Lost Galleon and Other Poems*, was gathered in 1867; his first prose book, *Condensed Novels*, appeared in 1867. From 1868 till 1870 he edited the *Overland Monthly*, which he had helped to organize, and in it he published *The Luck of Roaring Camp* (1868) and *The Outcasts of Poker Flat* (1869)—perhaps his best short stories—and also many others. His most popular poem, "Plain Language from Truthful James," better known as "The Heathen Chinee," made Bret Harte famous in 1870. In this year he was made professor of recent literature in the University of California, but he went to New York in 1871 to continue writing. After 1878 he held consular appointments at Crefeld in Germany (1878-80), at Glasgow, Scotland (1880-85), and after 1885 he dwelt in England. During the last years of his life he had his home near London, and a new volume, chiefly of short stories, appeared nearly every year. He died in Camberley, near London, May 5, 1902.

Most of Bret Harte's works depict life on the Pacific Slope in the early days, but he describes life also in the Atlantic States and in England. The more noteworthy among his works are: *Poems* (1870); *East and West Poems* (1871); *The Luck of Roaring Camp and Other Sketches* (1871); *Poetical Works* (1873); *Tales of the Argonauts* (1875); *Gabriel Conroy* (1876); *Two Men of Sandy Bar* (1876); *The Story of a Mine* (1878); *The Twins of Table Mountain* (1879); *Flip* (1882); *In the Carquinez Woods* (1883); *On the Frontier* (1884); *By Shore and Sedge* (1885); *Snowbound at Eagle's* (1886); *A Millionaire of Rough and Ready* (1887); *The Argonauts of North Liberty* (1888); *A Sappho of Green Springs* (1891); *Sally Dows* (1893); *In the Hollow of the Hills* (1895); *Clarence Barker's Luck* (1896); *Bulger's Reputation* (1896); *The Three Partners* (1897); *A Protégée of Jack Hamlin's* (1899); *From Sandhill to Pine* (1900); *Under the Redwoods* (1901). Bret Harte's collected works appeared in London (1881) and in Boston (1891), with supplementary volumes up to 1902.

Of those American authors whose charm lies mainly in their manner of emphasizing the characteristics of a highly flavored community, Bret Harte is one of the best. He was open-eyed and sympathetic in his delineation of adventurers. His story of the gambler who sacrificed himself for his snow-bound companions bears witness to Harte's first-hand acquaintance with perverse humanity. All his strongest tales of the Forty-

niners and of their followers give a view of early California that, in spite of an exaggeration perceptible to contemporary Californians, supplies an interesting supplement to formal history. Whether he tells of the rough Caucasian or of the mysterious Asiatic, Bret Harte has the knack of catching representative traits so admirably that we can see the whole of an almost lawless society. His stuff was romantic, melodramatic, and mostly disreputable. He handled it with humor, irony, pathos, or with a cynical lack of a superior point of view. He was imaginative in that he could cull the essence of things, but he was neither a dreamer nor a deep or far-seeing thinker. What was close to him he saw marvelously, and few writers have ever given a more distinct impression of being a part of what they have described. But Bret Harte is as impersonal as Maupassant. He assumes no responsibility, preaches no sermon, for his whole mind is absorbed in the portrayal of facts. The facts he coördinates with the genius of a born story-writer. Visible physical nature, wild cañons and mountains furnish him a setting. But Bret Harte admits nature only as a background. He delights in what is dazzling, spectacular, or dreadful. Yet his characters never pose. Many of them are even epically molded; but they are no heroes, or sorry ones at best. What one remembers most vividly is the gambler, the adventurer, the desperado, or the bedraggled woman. And these characters constitute a gallery of vagrants, sordid unfortunates, or downright rogues. Bret Harte wrote and wrote abundantly till the end. In his early work one may feel a quick intelligence, keenly interested in a new world. He is, through his subjects, and perhaps through his manner, an American author otherwise than by mere birth. His American qualities endeared him not only to his readers at home, but to many in Europe; for Europeans found and still find in him what in much American literature is too often faint or absent—an artistic portrayal of a phase of American life. Consult Pemberton, *Bret Harte* (London, 1901).

HARTE, Walter (1709-74). An English poet and historian. Educated at Marlborough and Oxford, he entered the Church, was preacher and teacher at his alma mater, and became vice-principal of Saint Mary Hall. His first poems, published at the age of eighteen, brought him the notice of Pope, whose stanch friend he afterwards became, and also his imitator in an *Essay on Reason* (1735). From 1745 to 1749 he was traveling tutor to the recipient of the famous Chesterfield Letters, and on his home-coming was made canon at Windsor, and afterwards rector in a Cornwall parish. His most pretentious work, a mine of information, *Life of Gustavus Adolphus, King of Sweden* (2 vols., 1759), was pronounced a very good book—in a German translation—but Harte's English was much better in his *Essays on Husbandry* (1764), approved both by Lord Chesterfield and Dr. Johnson.

HARTEL, här'tel, Wilhelm von (1839—). An Austrian philologist. He was born at Hof, in Moravia, and studied at the University of Vienna. He was appointed professor of classical philology at Vienna in 1872, made a member of the Vienna Academy in 1875, of the Berlin Academy in 1893; and became a life member of the Austrian House of Peers in 1890. In 1899 he was for a short time Minister of Education and Public Worship, to which post he was reappointed in 1900. His principal works are: *Homerische Studien* (1871-74; 2d ed. 1873); *Demosthenische Studien* (1877-78); *Studien über attisches Staatsrecht und Urkundenwesen* (1878); and various editions of classical authors, including the *Breviarium* of Eutropius (1872); Cyprian's *Opera Omnia* (3 vols., 1868-71); and Ennodius's *Opera* for the *Corpus Scriptorum Ecclesiasticorum*, published by the Vienna Academy of Sciences. He was made editor of the *Zeitschrift für Oesterreichische Gymnasien* in 1874; and with Schenkl founded the *Wiener Studien*, a journal on classical philology, in 1879.

HARTENSTEIN, här'ten-stīn, Gustav (1808-90). A German philosopher and author, born at Plauen, Saxony, and educated at Grimma and Leipzig, where in 1834 he was appointed professor of philosophy. He was one of the most gifted followers of Herbart, to whose philosophical views he gave wide extension in the works entitled *Die Probleme und Grundlehren der allgemeinen Metaphysik* (1836), and *Die Grundbegriffe der ethischen Wissenschaften* (1844).

HART'FORD. A city and port of entry, the capital of Connecticut, and the county-seat of Hartford County, 124 miles west by south of Boston, 32 miles north-northeast of New Haven, and 111 miles northeast of New York; on the Central New England, the New York, New Haven and Hartford, and the Connecticut Valley railroads (Map: Connecticut, E 2). It is situated at the head of navigation for large vessels on the Connecticut River, 50 miles from Long Island Sound, and at the mouth of Park River, a narrow stream that flows through the city, being crossed by several bridges. Hartford has a fine site, its more elevated sections commanding grand views of the Connecticut Valley, and is regularly laid out over an area of about 17 square miles. Much historical interest attaches to the city, the memory of its prominence in Colonial as well as in later times being preserved in several of its churches and houses, in its localities, and in its interesting collections of relics. The old State House, in which the Hartford Convention (q.v.) met, now serves as the city hall; and the new Capitol is a large and beautiful structure of white marble, with portraits and statues of famous persons. Several of the insurance companies for which Hartford is noted occupy fine offices, and among other pretentious buildings are the high school, Young Men's Christian Association building, State Arsenal, post-office, Wadsworth Athenæum, and Saint Joseph's Cathedral, the seat of the Bishop (Roman Catholic) of Hartford. Among the charitable institutions are Hartford and Saint Joseph's hospitals, Hartford Orphan Asylum, Old People's Home, Retreat for the Insane, American Asylum for the Deaf, and Asylum for the Blind. Hartford is the seat of Trinity College (q.v.) and of the Hartford Theological Seminary (Congregational) founded in 1834. Besides the libraries of these educational institutions, there are the State, Public, Watkinson, and Historical Society libraries. The city has a number of parks: Bushnell Park (46 acres), the site of the State Capitol, and Charter Oak Park, famous for its fair-grounds and trot-

CAPITOL

CONNECTICUT CAPITOL AT HARTFORD · SOLDIERS' MEMORIAL ARCH ON LEFT

ting track; also Keney, Elizabeth, South, Riverside, Pope, and other parks.

In 1887 Hartford was made a port of entry. It has considerable commercial importance, but is most widely known as the centre of vast insurance interests and for its manufacturing concerns. The principal manufactures are bicycles, firearms, Gatling guns, woven wire, mattresses, screws, nails, pins, envelopes, steam boilers and engines, machinery, car-wheels, hosiery, knit goods, furniture, carriages, and electric vehicles. The city also controls an extensive trade in Connecticut tobacco. The government, as provided by the charter of 1856, revised in 1880, is vested in a mayor, elected biennially, a bicameral council, and subordinate administrative officials, as follows: Fire, street, health, charity, police, and water commissioners, building inspector, and city attorney, appointed by the executive with the consent of the board of aldermen, and city clerk, collector, auditor, treasurer, marshal, and school board, chosen by popular election. The park commissioners make appointments to fill vacancies on their own board. The annual income and expenditures of the city amount to about $2,390,000 and $2,215,000 respectively, the principal items of expense being $55,000 for street-lighting, $95,000 for charitable institutions, $100,000 for the fire department, $125,000 for the police department, and $315,000 for schools. The city owns its water-works, which are operated at a yearly cost of $55,000. Population, in 1800, 5347; in 1850, 17,966; in 1870, 37,180; in 1880, 42,015; in 1890, 53,230; in 1900, 79,850, including 23,800 persons of foreign birth, and 1900 of negro descent.

In 1633 the Dutch built on what is still known as Dutch Point a fort which they called the 'House of Hope.' A number of Massachusetts colonists, mostly from Newtown (Cambridge), left their homes in 1635 and 1636, partly because of a dispute over the civil rights of non-church members, and, led by their pastors, Thomas Hooker (q.v.) and Samuel Stone, settled at Hartford. The name Newtown was at first adopted, but in 1637 it was discarded for Hartford—Hertford, England, being the birthplace of Stone. On January 14, 1639, the freemen of Windsor, Hartford, and Wethersfield met at Hartford and, influenced by Hooker, adopted the famous 'Fundamental Orders of Connecticut,' the first written constitution adopted by a people that ever organized a government. For this reason Hartford is frequently called the 'birthplace of American democracy.' On September 19, 1650, Peter Stuyvesant and commissioners from the 'United Colonies' signed a treaty at Hartford by which boundary disputes were adjusted, and the Dutch confirmed in possession of their fort. In 1654, however, this fort was seized, and the Dutch expelled from Connecticut. In 1687 Governor Andros came to Hartford and made an attempt to seize the Connecticut charter. (See CHARTER OAK.) Washington and Rochambeau met here in 1780 to plan the Yorktown campaign, and in 1814-15 the Hartford Convention (q.v.) was in session here. Until 1701 Hartford was the capital of Connecticut; from 1701 to 1873 it shared that honor with New Haven; and since 1875 it has been sole capital. Noah Webster, Henry Barnard, John Fiske, Richard Burton, and Frederick Law Olmsted were born in Hartford, and among the notable writers who have made it their home are Harriet Beecher Stowe, Whittier, Lydia Huntley Sigourney, John Trumbull, Joel Barlow, Horace Bushnell, Charles Dudley Warner, and Samuel L. Clemens. Consult: Trumbull, *The Memorial History of Hartford County* (Boston, 1886); and sketches in Powell, *Historic Towns of the New England States* (New York, 1898), and *Connecticut Magazine*, vol. v. (Hartford, 1899).

HARTFORD, THE. The flagship in which Admiral Farragut made his attack on New Orleans, in April, 1862. She was also his flagship in the attack on Mobile.

HARTFORD CITY. A city and the county-seat of Blackford County, Ind., 72 miles northeast of Indianapolis; on the Lake Erie and Western and the Pittsburg, Cincinnati, Chicago and Saint Louis railroads (Map: Indiana, D 2). It is supplied with natural gas, and oil interests are being developed; there are manufactures of paper and pulp, strawboard, glass, iron, flour, hubs and spokes, etc. The water-works are owned by the municipality. Population, in 1890, 2287; in 1900, 5912.

HARTFORD CONVENTION. In American history, a political assembly representing the Federalists of New England States, which met at Hartford, Conn., December 15, 1814, and adjourned *sine die*, January 5, 1815. Its members numbered twenty-six, twelve coming from Massachusetts, seven from Connecticut, four from Rhode Island (all appointed by the Legislatures of their respective States), two from counties in New Hampshire, and one from Windham County, Vt. The convention grew out of the opposition of the Federalists in New England to the War of 1812, and its members all belonged to that party. George Cabot, of Massachusetts, was elected president, and Theodore Dwight, of Connecticut, secretary. The members were as intelligent and as high-minded men as could have been found in the country, but Federalism was exceedingly unpopular, and the fact that the sessions were held with closed doors, and that the members were pledged to secrecy, gave rise to a report that the secession of the New England States was contemplated. The extreme stand thus attributed to the leading Federalists (q.v.), as well as their pronounced opposition to the war, hastened the movement which resulted in the complete overthrow of the Federalist Party. The object of the convention was to devise means not only of security and defense against foreign nations, but also for safeguarding the privileges of the separate States against the alleged encroachments of the Federal Government; and no treasonable intention could be proved. The act of Massachusetts calling the convention stated that the steps taken by the consulting body were to be "not repugnant to their obligations as members of the Union;" and the resolutions of Connecticut and Rhode Island were to the same effect. The main propositions were stated in the form of amendments to the Federal Constitution, which the convention recommended to the several States. The suggested changes were that direct taxes and representatives be apportioned among the States according to the number of free persons therein; that no new State should be admitted to the Union except upon a two-thirds vote in each House of Con-

gress; that Congress should have no power to lay an embargo on ships of American citizens for more than sixty days; that Congress should not interdict foreign commerce or declare offensive war except by a two-thirds vote; that no person thereafter naturalized should be capable of sitting in Congress or of holding any Federal civil office; that no person should serve as President more than one term; and that the President should never be chosen twice successively from the same State. The delegates further resolved that, if their recommendations should not be heeded and if the defense of their respective States should still be neglected, a further convention should be created "with such powers and instructions as the exigency of a crisis so momentous may require."

The war was practically over before the convention finished its work, the Treaty of Ghent (q.v.) having been concluded on December 24th, though the fact was unknown to the members of the convention. The battle of New Orleans, January 8, 1815, and the ratification of the Treaty of Ghent (February 17th) increased the popularity of the Government and hastened the downfall of the Federalist Party; and 'Hartford Convention Federalist' was for many years a term of reproach. The controversy over the absolute obligation of a Governor to respond to the President's call for the militia presented a problem in constitutional law, and in the relations of the States to the Union, which was not fully settled even at the outbreak of the Civil War. For an authoritative and complete work, consult the *History of the Hartford Convention* (New York, 1833), by Theodore Dwight, secretary of the convention; also consult: Lodge, *Life and Letters of George Cabot* (Boston, 1877); and Henry Adams, *Documents Relating to New England Federalism* (Boston, 1877). See FEDERALISTS.

HARTFORD THEOLOGICAL SEMINARY. A Congregational institution, founded in 1834 at East Windsor Hill, Conn., under the name of the Theological Institute of Connecticut, and removed in 1865 to Hartford, with a change of name. The legal constitution of the seminary vests its control in a board of trustees, who are elected by the Pastoral Union—an association of nearly 200 ministers, all of whom give assent to the creed of the Union, a statement of doctrine drawn up in 1834, with singular breadth of view. Although the seminary was established at a time of theological controversy, the occasions of dispute then have long ago ceased to exist, and the institution now is concerned simply with the problem of training ministers for present-day work on the broadest lines of intellectual and spiritual development. In the reconstruction of theological pedagogy in America during the last twenty-five years, the seminary has been often the pioneer and always abreast of the most enterprising progress. The faculty in 1903 numbered twelve professors and twelve regular lecturers, and the student body was about eighty-five. At that time the library contained over 81,000 volumes and nearly 45,000 pamphlets—being unsurpassed in this country in several of its special collections. The main buildings are Hosmer Hall, valued at $150,000, erected in 1880 by James B. Hosmer, and the Case Memorial Library, erected in 1902 by Newton Case at a cost of $100,000. Since 1890 the faculty has issued *The Hartford Seminary Record*, a quarterly magazine.

HARTIG, här'tĭk, FRANZ, Count (1789-1865). An Austrian statesman. He held a number of important posts under the Government until the appearance of his book, *Genesis der Revolution in Oesterreich* (3d ed. 1851), describing the beginning of the liberal movement in Austria, forced him into retirement. In 1860 he was elected to the Reichsrat, where he played a prominent part as a member of the Liberal Centralist Party. In 1861 he was called to the Austrian House of Lords, of which he remained a member until his death.

HARTIG, GEORG LUDWIG (1764-1837). A German forester. He was born at Gladenbach, and was educated at Giessen, where he studied mathematics, political economy, geodesy, and physics. While in the service of Prince Solms-Braunfeld at Hungen, Hartig established a school of forestry which became the model for future institutions of this kind. In 1811 he was appointed chief of the department of forestry at Berlin; and it was due to his firmness that a large part of the German forests was not sacrificed to meet the financial exigencies of the time. He wrote in all thirty-one works, such as: *Anweisung zur Holzzucht für Förster* (8th ed. 1818); *Lehrbuch für Förster* (11th ed. 1877); *Lehrbuch für Jäger* (11th ed. 1884); and *Kubiktabellen* (10th ed. 1871).

HARTIG, ROBERT (1839—). A writer on forestry, born at Brunswick, a son of Theodor Hartig (q.v.), and educated at the Collegium Carolinum, of Brunswick, and at Berlin. In 1878 he was appointed professor of botany at Munich. The scientific labors of Hartig in the department of vegetable pathology have contributed greatly to the development of that branch of science. Prior to his investigations on the progressive stages of disease in trees, little or nothing had been done in this department of scientific inquiry; so that Hartig may be considered the founder of arboreal pathology. His more important works include: *Die Unterscheidungsmerkmale der wichtigern in Deutschland wachsenden Hölzer* (3d ed. 1890); *Lehrbuch der Baumkrankheiten* (2d ed. 1889; Eng. trans. by W. Somerville, 1894). In this work the author reviews the development of the study of vegetable pathology; the causes of vegetable disease; the injuries induced by such plants as cryptogams, fungi, and phanerogams; and wounds, and diseases due to conditions of the soil.

HARTIG, THEODOR (1805-80). A German forester and naturalist. He was born at Dillenburg, was educated at Berlin (1824-27), and was successively lecturer and professor of forestry at the University of Berlin (1831-38) and at the Carolinum, Brunswick. His works include: *Die Aderflügler Deutschlands* (2d ed. 1860); *Vergleichende Untersuchungen über den Ertrag der Rotbuche* (2d ed. 1851). In collaboration with his father, Georg Ludwig Hartig, he also published the work entitled, *Forstliches und naturwissenschaftliches Konversationslexikon*. The eleventh edition of his father's *Lehrbuch für Förster*, the later reprints of which he had revised, was published in 1877.

HART'INGTON. A city and the county-seat of Cedar County, Neb., about 20 miles south by

east of Yankton, S. D.; on the Chicago, Saint Paul, Minneapolis and Omaha Railroad (Map: Nebraska, G 1). It is the centre of a farming and stock-raising district, and has some manufactures. Population, in 1900, 971.

HARTINGTON, Marquis of. See Devonshire, Eighth Duke of.

HARTLAUB, härt'loup, Gustav (1814-1900). A German ornithologist, born in Bremen, and educated at Berlin, Bonn, and Göttingen. In addition to his contributions on ornithology to Troschel's *Archiv der Naturgeschichte* during a period extending from 1846 to 1871, he published several valuable scientific works chiefly on the birds of Africa. These include: *System der Ornithologie Westafrikas* (1857); *Beitrag zur Fauna Centralpolynesiens* (jointly with Finsch, 1867); "Die Vögel Ostafrikas" (also with Finsch, in vol. iv. of Decken's *Reisen in Ostafrika*, 1870); and *Die Vögel Madagaskars und der benachbarten Inselgruppen* (1877).

HARTLEBEN, härt'lâ-ben, Otto Erich (1864—). A German writer, born in Clausthal. He studied at Berlin, Tübingen, and Leipzig, and in 1889-90 was in the Government service as referendary successively in the district court of Stolberg-am-Harz and the criminal court of Magdeburg. His literary work includes some earlier verse, but consists of dramas principally, ranging from the satiric to the tragic. Of these *Rosenmontag* (1900) was perhaps best received. Some of them have found presentation in the United States.

HARTLEPOOL, här't'l-pōōl. An ancient seaport, market-town, and municipal borough, in Durham County, England, on a small peninsula in the North Sea, 18 miles east-southeast of Durham (Map: England, E 2). Sea fisheries, iron shipbuilding, marine engineering, cement manufacture, and coal trade are its chief industries. Its principal buildings are the borough hall, and Saint Hilda's Church of the thirteenth century, with its lofty embattled tower. Its lighthouse is visible 15 miles. A substantial sea-wall and esplanade are attractive features on the seaward side. The town maintains cemetery, markets, and free public library. It grew up around a monastery of which Saint Hilda was abbess, and its harbor was of importance in 1171. Its first charter was granted by King John. Population, in 1891, 21,300; in 1901, 22,700. Consult Sharpe, *History of Hartlepool* (1806; new ed. 1851).

HARTLEPOOLS, The. A Parliamentary borough and port of Durham County, England, comprising the municipalities of Hartlepool (q.v.) and its extension, West Hartlepool (q.v.).

HART'LEY, Sir Charles Augustus (1825 —). An English engineer and railroad-builder. He served through the Crimean War as captain of engineers in the Turkish contingent; was made engineer-in-chief of the European Commission of the Danube in 1856, and in 1862 was knighted. In 1867 he drew up plans for the enlargement of the harbor of Odessa, and won with them the competitive prize of 8000 silver rubles offered by the Emperor of Russia. In 1875 he was a member of the board of engineers appointed by the President of the United States to report on the practicability of J. B. Eads's plan for improving the south pass of the Mississippi River by means of jetties. The British Government named him a member of the International Technical Commission on the Suez Canal in 1884. As a consulting engineer he was employed by several governments, notably on the harbor and river improvements of the Hugli, the harbor of Triest, the Nile Barrage below Cairo, and the harbor of Varna. Among his published works are: *Delta of the Danube; Public Works in the United States and Canada; Inland Navigation in Europe;* and *History of the Engineering Works of the Suez Canal.*

HARTLEY, David (1705-57). A celebrated English philosopher. His father was Vicar of Armley, in Yorkshire. At fifteen he entered Jesus College, Cambridge, and afterwards became a fellow of the college. He studied at first for the Church, but dissented from some points in the Articles, and in consequence had to abandon his original intention. He finally chose the profession of medicine, in which he attained considerable eminence. He practiced as a physician successively in Newark, Bury Saint Edmunds, London, and Bath, where he died. His chief work, entitled *Observations on Man, His Frame, His Duty, and His Expectations,* was begun when he was about twenty-five, and occupied him for sixteen years. It was published in 1749, and was translated into French and German. The first part relates to the constitution of the human mind, and is the really important and original part. The second part treats of religion and morals.

His handling of the mind turns throughout upon two theories. The first is called the doctrine of vibrations, or a theory of nervous action analogous to the propagation of sound, the suggestion of which he owed to Newton, of whose writings he was a student. The second theory was that the higher activities of the mind might be explained to a very wide extent by the principle of the association of ideas (see Association of Ideas)—a principle far from new in the statement of it, but never before appreciated in anything like the range of its bearings upon the phenomena of mind.

The doctrine of vibrations supposed that when any one of the senses was affected by an outward object, the effect was to set the particles of the nerve in a vibratory motion, which ran along to the brain, and produced corresponding vibrations in the cerebral substance. In like manner, when an active impulse proceeded outward to the muscles, the manner of communication along the nerves was of the same kind. He even extended these molecular vibrations to the other tissues. All conscious processes were regarded as having physiological correlations in brain processes. The opposition that immediately manifested itself against this part of Hartley's speculations arose from a mistaken notion that it favored materialism.

As regards the second doctrine of Hartley, the doctrine of association, he has the right to be regarded as the founder of the English school of association, although thinkers before him, among whom were Locke and Hume, had used the principle of association to explain many of the more developed mental contents. But it seems that Hartley was the first to make association a principle for the explanation of all complex psychical phenomena. He maintains that it is involved in the conversion of our sensations into ideas, and

also in the first origin of voluntary power, which he truly regards as essentially an acquired power. He then treats of the commonly recognized intellectual faculties, memory, imagination, reason, etc. Lastly, the emotions, which he classifies under six heads, imaginative emotions, ambition, self-interest, sympathy, theopathy (the religious sentiment), and the moral sense, may, according to him, be readily seen to be the products of association of certain elementary feelings that unite among themselves, and pass into new connections, and give birth to complex feelings, under the general law. Many of those explanations would be considered now as faulty or defective; but at the time Hartley's attempt was a great step in advance. In logic he seems to have been the forerunner of the algebraical theory of that science. In addition to the work mentioned above, Hartley published in 1746 *Conjectura Quadam de Motu, Sensus et Idearum Generatione.* Consult: Bower, *Hartley and James Mill* (London, 1881); Schönlank, *Hartley und Priestley, die Begründer des Associationismus in England* (1882).

HART'LEY, DAVID (1732-1813). An English politician. He studied at Corpus Christi College, Oxford, and afterwards entered politics as a Liberal. Among his friends was Benjamin Franklin, whom he met during Franklin's stay in London, and with whom after his departure began a correspondence which continued through the years of the Revolution. He strongly opposed the policy of Lord North's Ministry in forcing a war with America, and labored to effect an exchange of prisoners, believing that any amelioration of hardships or acts of generosity would tend to lessen the bitter feelings of the combatants. He was a zealous supporter of Rockingham; and this, together with his friendship for Franklin, probably led to his selection as Plenipotentiary to sign the treaty of peace with the United States (Paris, September 3, 1783). His writings were nearly all of a political character, such as: "Two Letters from David Hartley, Esq., M.P.," in *Tracts Concerning County Petitions* (1780); and *An Address to the Committee of Association of the County of York* (1781). Consult: *The . . . Memoirs of Sir Nathaniel William Wraxall, 1772-84* (1884); *The Complete Works of Benjamin Franklin,* edited by John Bigelow (New York, 1887-88); and Hale, *Franklin in France* (Boston, 1888).

HARTLEY, JONATHAN SCOTT (1845—). An American sculptor, born in Albany, N. Y. He was educated at Albany, and afterwards went to England, where he studied at the Royal Academy, London. From 1876 to 1884 he was professor of anatomy at the schools of the Art Students' League, and from 1879 to 1889 president of the League. His works include the bas-relief on the monument at Saratoga erected to commemorate the defeat of Burgoyne, a statue of Miles Morgan at Springfield, Mass. (1882), and a number of ideal figures, among them the "Young Samaritan" and the "Whirlwind."

HART'LIB, SAMUEL (c.1600-c.1670). An English social reformer. He was born at Elbing, West Prussia, of Polish ancestry, and went to London in 1628. He is said to have introduced the earlier writings of Comenius into England (1637 and 1639), and to have taken an active part in the movement for the unification of the various Protestant sects. He was an intimate friend of Milton, and is said to have been very charitable. His publications, which are devoted chiefly to educational and economic reforms, include: *Considerations Tending to the Happy Accomplishment of England's Reformation in Church and State* (submitted to Parliament in 1647); *Macaria* (1641), containing the outlines of an ideal State; and *The Reformed Husbandman* (1651).

HARTMANN, härt'mân, JAKOB, Freiherr von (1795-1873). A German soldier, born at Maikammer, in the Palatinate. He was trained in the French military institutes of Bonn and Saint Cyr; in the campaigns of 1814-15 served in the French ranks against the Allies, and, having entered the Bavarian Army in 1816, rose to be lieutenant-general in that organization (1861). As such, he fought against Prussia in 1866. Promoted to be general (1869), he commanded the Second Army Corps of Bavaria in the Franco-German War, during which he captured the fortress of Marsal, and took a noteworthy part in the battle of Sedan. Subsequent to the war he retained command of the corps, with headquarters at Würzburg.

HARTMANN, JOHAN PEDER EMILIUS (1805-1900). A Danish composer, born at Copenhagen. He was one of a family of German-Danish musicians, a grandson of Johan Hartmann, the composer, and the son of August Wilhelm Hartmann, who was an organist at Copenhagen (1800-50), and the teacher of his more distinguished son. Young Johan became a teacher in the Conservatory in 1827, director in 1840, and royal chapel-master in 1849. He composed a number of works, among which are the operas: *The Raven, or Brotherly Proof* (1832); *The Golden Horns* (1834); *The Corsairs* (1835); *Little Christina* (1846); music for dramas by Anderson, Oehlenschläger, and Heiberg; song cycles, and instrumental music for piano and violin, etc. From 1839 to 1892 he was president of the Musical Association of Copenhagen. He ranks among the first of Danish composers.—His son, EMIL HARTMANN (1836—), born at Copenhagen, was at first an organist, and afterwards gave himself entirely to composition. His works consist of ballets, overtures, songs, several operas, and much instrumental music.

HARTMANN, Sir JULIUS VON (1774-1856). A German general, born in Hanover. He served in the Hanoverian artillery against France in the Netherlands (1793-94), and from 1803 in the German Legion, in which, as commander of artillery, he fought under Wellington in the Peninsular campaign and at Waterloo. In 1833 he was appointed to the command of the entire Hanoverian artillery, which he efficiently organized, in 1836 was promoted to be lieutenant-general, and in 1850 was retired.

HARTMANN, KARL ROBERT EDUARD VON (1842—). A German philosopher. He was born in Berlin, February 23, 1842, educated at the school of artillery, and held a commission from 1860 to 1865, when he resigned it because a serious knee trouble, brought on by an accident, made it impossible for him to perform his duties. In 1867 he took his degree at Rostock and returned to Berlin, where he has lived ever since, devoted to literary pursuits, and doing most of

his work in bed, while suffering great pain. This circumstance has, however, not diminished his literary activity. The titles of some of his works will show his versatility: *Aphorismen über das Drama* (1870); *Shakespeares Romeo und Julia* (1875); *Die Selbstzersetzung des Christenthums und die Religion der Zukunft* (1874); *Wahrheit und Irrthum im Darwinismus* (1875); *Zur Reform des höheren Schulwesens* (1875); *Beiträge zur Naturphilosophie* (1876); *Zur Geschichte und Begründung des Pessimismus* (1880); *Die Krisis des Christenthums in der modernen Theologie* (1880); *Der Spiritismus* (1885); *Aesthetik* (1886-87); *Zwei Jahrzehnte deutscher Politik und die gegenwärtige Weltlage* (1888). But these are not his most important works. His first book, *Philosophie des Unbewussten* (1869; Eng. trans. by E. C. Coupland, under the title *The Philosophy of the Unconscious*, London, 1884), went through edition after edition, and gave rise to a very copious controversial literature. Höffding says that between the years 1870 and 1875 fifty-eight works appeared treating of Hartmann's philosophy. Its peculiar combination of optimism with pessimism is no doubt the cause of its popularity.

In opposition to Schopenhauer (q.v.), Hartmann maintains that idea is indispensable to will. "No one can in reality merely *will*, without willing *this* or *that:* a will which does not will something, is not; only through the *definite content* does the will obtain the possibility of existence, and this content is *idea*. Therefore *no volition without mental object*, as Aristotle said long ago." Against Hegel, whom Hartmann mistakenly conceives as advocating a doctrine of non-willing idea, he maintains that it is necessary "to recognize will in the idea, whenever the latter displays an outward causality." The world, as being a process, must therefore be the product of will; and as will implies idea, it must be the product of will realizing an idea. But, according to Hartmann, an idea need not be conscious. Indeed, consciousness "cannot at all lie in the idea as such, but must be an accident; which comes to the idea from elsewhere. The action of unconscious will is clearer in itself, and appears less paradoxical;" indeed, will must be unconscious if the idea is unconscious. The term 'the Unconscious' is used by Hartmann to "designate the united unconscious will and unconscious idea," or the subject of which unconscious will and unconscious idea are the two attributes inseparably united. Will and idea "are not two drawers in the Unconscious, in one of which lies the irrational will, in the other the powerless idea, but they are two poles of a magnet with opposite qualities, on whose opposition the world rests." They "contradict one another as little as say the redness and the perfume of the rose." But though thus compatible, "the one is what the other is not (the will is not logical, and the idea not endowed with will)." 'The Unconscious,' thus defined, is an individual, "an unconscious world-soul," which is "simultaneously present and purposively efficient in all organisms and atoms, the bodily life and the human mind." It is one in all space and in all time, space and time being its creations, not its conditions. It can properly be defined as "pure, unconscious (impersonal but indivisible, therefore individual) Spirit," and in accordance with this definition Hartmann says that "our Monism may be more precisely characterized as spiritualistic Monism." Consciousness arises out of the 'unconscious' by "the emancipation of the idea from the will." "The essence of the consciousness of the idea is the extrication of the same from its native soil, the realizing will, and the opposition of the will to this extrication." The conscious idea "is idea preëminently free from every effort at self-realization, but without prejudice to the possibility of afterwards becoming itself again content of will." This emancipation of idea from will arises when organized matter suddenly breaks in upon this self-contained peace of the Unconscious and thrusts upon the astonished individual spirit an idea which falls upon it as from the skies, for it finds in itself no will to the idea. "The idea has been sent from the will, to confront it in future as independent power, in order to bring under subjection to itself its former lord." The will endeavors to negate the idea but cannot, and this failure is the cause of pain, which is "the vexation of the unconscious individual mind at the interloping idea." This break-up of the original unity of will and idea is itself the work of 'the Unconscious,' which "can never err—nay, not even doubt or hesitate;" it "occurs precisely at the most suitable moment, when the whole purpose frame of the world requires it." Indeed, "the world is contrived and guided as wisely and as well as is possible." "The existing world is the best of all possible ones," and yet "it may still be thoroughly bad," its non-existence may be preferable to its existence. An empirical examination of the facts proves this to be the case. The contrary belief is an illusion of which there are three stages. The childhood of the individual and the race is spent in the illusion that the individual can attain happiness now; the youth of the race (mediævalism) is spent in the belief that happiness is attained by the individual in a transcendent life after death; and the manhood of the race is spent in the illusion that happiness is attainable by others in this world in the remote future. The true view is that of "the final redemption from the misery of volition and existence into the painlessness of non-willing and non-being." But this redemption can be won only by making "the ends of the Unconscious ends of our own consciousness." And the end of the unconscious is the elimination of misery. Positive happiness is unattainable. But "only in complete devotion to life and its pains, not in cowardly renunciation and withdrawal, is anything to be achieved for the world-process. This devotion to life is necessary for the time being, since only by contributing to the advance of intelligence can we hope to bring about a state of affairs in which the major part of the actual volition or of the functioning Unconscious Spirit shall be under the control of intelligence. When this consummation is achieved, then volition will resolve upon its own non-continuance, seeing that continuance involves a surplus of misery. This resolve will be a simultaneous common resolve of individuals in whom the larger half of the active Spirit of the universe is manifest." For a survey of the controversial literature on Hartmann's teaching, consult: Plumacher, *Der Kampf ums Unbewusste* (2d ed., Leipzig, 1890); also in general Kober, *Das philosophische System Eduard von Hartmanns* (Breslau, 1884); Drews, *Eduard*

von Hartmanns Philosophie und der Materialismus in der modernen Kultur (Leipzig, 1890).

HARTMANN, MORITZ (1821-72). An Austrian poet and novelist, born of Jewish parents at Duschnik, Bohemia. He studied at Prague and Vienna, traveled in Italy, Switzerland, and Germany, and afterwards taught in Vienna till 1844, when he felt it wise to leave his native country in order to publish *Kelch und Schwert* (1845), radical in its religious and patriotic sentiment. *Neuere Gedichte* (1847) followed a residence in Belgium and France. He then returned to Austria and was imprisoned, but was freed by the Revolution of March, 1848. He became the leader of the German Party at Prague, was chosen Deputy to the National Assembly at Frankfort, fled from Vienna in time to escape imprisonment, and took part in the 'Rump Parliament' at Stuttgart. From 1849 to 1868 he lived in voluntary exile in Switzerland, England, Ireland, and the East, residing longest in Paris, Geneva, and Stuttgart. He was Paris correspondent of the *Kölnische Zeitung*, and represented it in the Crimea during the Russo-Turkish War. In 1865 he settled in Vienna as one of the editors of the *Neue Freie Presse*. One of his best-known works is a political satirical poem, the *Reimchronik des Pfaffen Maurizius* (1849). He also published volumes of tales (1863-66), under the titles *Novellen* and *Nach der Natur*. Hartmann's select poems were edited in 1874; his *Works*, in 10 vols., 1873-74. Consult Brandes, *Das junge Deutschland* (Leipzig, 1891).

HARTMANN, ROBERT (1832-93). A German anthropologist, born at Blankenburg. He was educated at Berlin, and was made professor of anatomy there in 1867. He wrote: *Reise des Freiherrn A. von Barnim durch Nordafrika* (1863), a description of an expedition in which he had taken part in 1859 and 1860; *Naturgeschichtlich-medizinische Skizze der Nillander* (1865); *Die Völker Afrikas* (1879); *Handbuch der Anatomie des Menschen* (1881); *Der Gorilla* (1881); *Die menschenähnlichen Affen* (1883); and the anthropological part of the report of the cruise of the man-of-war *Gazette*. With Bastian he founded the *Zeitschrift für Ethnologie*.

HARTMANN VON AUE, fŏn ou'e. A German poet. See AUE, HARTMANN VON.

HARTNACK, härt'näk, EDMUND (1826-91). A German optician, born at Templin. He worked under Ruhmkorff in Paris, and with Oberhäuser, whose establishment he bought. After 1870, when he was forced to leave Paris, he sold the factory and established a new one at Potsdam. He made many improvements in the microscope, especially by his extension of Amici's system of immersion, and by his work on the Nicol prism.

HARTO'GIA (Neo-Lat. nom. pl., named in honor of John *Hartog*, an early traveler). A genus of trees, or shrubs, of the natural order Rutaceæ. *Hartogia capensis*, now known as *Agathosmia hispida*, a native of the Cape of Good Hope, is only 10 or 15 feet high, but the trunk is a foot to a foot and a half in diameter. The wood, which is hard, fine-grained, close, and tough, is much valued as veneer, and when polished is equal to the finest mahogany. The Dutch colonists call it ladlewood, probably from one of the first uses to which they found it convenient to apply it.

HART'RANFT, JOHN FREDERIC (1830-89). An American soldier and politician, born in Pennsylvania. He graduated at Union College in 1853, and was admitted to the bar in 1859. He was among the first to answer President Lincoln's call for volunteers in the spring of 1861, and took part in the first battle of Bull Run as aide-de-camp on the staff of Gen. William B. Franklin. He then raised the Fifty-first Pennsylvania Regiment, which he led in a brilliant and successful charge at Antietam. He commanded a brigade at Vicksburg, and afterwards was with Sherman in the advance to Jackson, Miss. He recaptured Fort Stedman before Richmond, displaying great bravery, for which he was brevetted major-general. After the war he was twice chosen Auditor-General of Pennsylvania, and served as Governor for two terms, during which he reorganized the militia of the State and put it upon a strictly military basis.

HARTSHORN. The name given in pharmacy to the antlers of the *Cervus elaphus*. Its composition is very different from that of persistent horns, as those of the ox, for example, and is identical, or nearly so, with that of bone. The products of its distillation were formerly much used in medicine, under the titles of oil of hartshorn, volatile salt of hartshorn, spirits of hartshorn, etc.; but they are now replaced by simpler preparations of the active ingredients of these substances, namely, ammonia and carbonate of ammonia. See also AMMONIA.

HARTS'HORNE, EDWARD (1818-85). An American physician, born in Philadelphia. In 1843, and again in 1844, he published reports in favor of the separate system of prison discipline, which attracted considerable attention, as they were the first written by one who had had experience with the practical workings of the system. In 1847 he was the secretary of the first prison discipline convention which met in Philadelphia, and ten years later acted in the same capacity to the first sanitary convention in the United States.

HARTSOEKER, härt'sōō-kēr, NIKLAAS (1656-1725). A Dutch physicist and histologist, born at Gouda. He early showed a taste for mathematics and physics; studied these subjects without the permission or knowledge of his father, a Reformed clergyman, who wished his son to become a clergyman; and at the age of eighteen made a powerful microscope, with which he made striking discoveries regarding spermatozoa. His father finally consented to his going to Leyden, and later to Amsterdam, where he met Huygens, and confided to him his discoveries. In 1678 he went to Paris and studied under Cassini; from 1684 to 1696 he lived in Paris, and then returned to Holland to become the instructor of Peter the Great. He went to Düsseldorf, in 1704, on the urgent invitation of the Elector of the Palatinate, and was appointed honorary professor at Heidelberg. In 1717, after the Elector's death, he moved to Utrecht, where his continued application to work broke his health. His works include: *Essai de dioptrique* (1694), in which his independent discovery of many of Newton's observations on light appeared, as well as a well-defined theory of general physics; *Principes de physique* (1696), developing this theory; *Conjectures physiques* (1707-08); and *Cours de physique* (1730).

HART'S-TONGUE FERN. A name applied to ferns of the genus Scolopendrium, or Phyllitis, as it is sometimes designated. They are large ferns with oblong, strap-shaped leaves or fronds. *Scolopendrium vulgare* is common in Europe and Asia, but, so far as is known, is rare in America. It occurs in damp ravines or under limestone cliffs in a few localities in New York, Tennessee, and Canada. The fronds are 10 to 15 inches high and 1 to 2 inches broad, with heart-shaped bases, and entire or undulate margins. The fruit-dots are linear and occur by twos almost at right angles to the midrib, one occurring on the upper side of a veinlet and its mate on the lower side of the next veinlet; thus they appear to be arranged in pairs.

HART'SUFF, George Lucas (1830-74). An American soldier, born at Tyre, N. Y. He graduated at West Point in 1852, and served on the frontier and in Florida, where, during a fight with the Seminole Indians, he received a wound which eventually caused his death. In March, 1861, he was appointed assistant adjutant-general with the brevet rank of captain, and was assigned to duty under Rosecrans in West Virginia. Later he was severely wounded at Antietam, and immediately after the battle was made brevet colonel for gallant and meritorious services. On March 13, 1865, he was given the brevet rank of major-general in the Regular Army, and from April 3d to May of the same year was in command of City Point and Petersburg. He was mustered out of the volunteer service on August 24, 1865, and resigned from the Regular Army on June 29, 1871, because of disability resulting from wounds received in battle.

HART, Charles Frederick (1840-78). An American geologist, born at Fredericton, N. B. He studied under Agassiz for a number of years, and then accompanied him as geologist on an expedition to Brazil in 1865. After his return he was appointed professor of geology and physical geography at Cornell University, but interrupted his university duties to make three more expeditions to Brazil, where he finally settled in 1875 to enter upon his great work as chief of the geological commission appointed to make a survey of the entire empire. Scarcely more than two years later, however, he contracted a fever and died. His principal publication is *The Geology and Physical Geography of Brazil* (1870). Consult Hay, "The Scientific Work of Prof. Charles Frederick Hartt," in the *Proceedings and Transactions of the Royal Society of Canada*, series 2, vol. v. (Ottawa, 1899).

HARTWICH, härt'vik, Emil Hermann (1801-79). A German engineer, born at Bensdorf, near Brandenburg. He was inspector of waterworks in Steinau and commissioner of buildings at Danzig, where he undertook the completion of the moles in the Baltic near Neufahrwasser. He built the bridge over the Rhine at Coblenz, and introduced many English methods in German railroads, especially a central switch apparatus. Among his writings are: *Erweiterungsbauten der rheinischen Eisenbahn* (1864-67); *Denkschrift, betreffend die Herstellung einer Eisenbahn welche Berlin durchschneidet* (1872); *Aphoristische Bemerkungen über das Eisenbahnwesen* (2d ed. 1874); and many contributions to the *Zeitschrift für Bauwesen*.

HARTWIG, härt'vik, or **HARTWICK,** John Christopher (1714-96). A German-American Lutheran clergyman. He was born in Saxe-Gotha, and is said to have studied at the University of Halle. In 1745, after having been ordained in the German Lutheran Church in London, he came to America to take charge of several churches in Albany and Dutchess Counties, N. Y. Two years later he assisted at the organization of the First Lutheran Synod in Philadelphia. Besides his work in New York, his clerical labors extended also to Pennsylvania, Maryland, Virginia, and New England. In 1761 he obtained the title to 21,500 acres of land in Otsego County, N. Y., which he had bought from the Indians. This was employed, in accordance with his directions, to establish a theological and classical seminary. This institution, known as the Hartwick Seminary, was opened at Hartwick, N. Y., in 1815.

HARTWIG, Otto Peter Konrad (1830—). A German historian, born at Wichmannshausen. He studied theology and linguistics at Marburg, Halle, and Göttingen, and in 1867 became a member of the staff of the Marburg University library, from which he went to the University of Halle as librarian-in-chief, a post he resigned in 1898. In 1884 he founded, with Schulz, the *Centralblatt für Bibliothekswesen*. Among Hartwig's works are: *Henricus de Langenstein* (1857); *Aus Sicilien* (1867-69); *Sicilianische Märchen*, with the notes of Pauli, and a biographical sketch of him (1870); *Die Uebersetzungslitteratur Unteritaliens in der normannisch-staufischen Epoche* (1886); *Sulla data degli sponsali di Arrigo VI. con la Costanza*, etc., with Amari (1878); *Quellen und Forschungen zur ältesten Geschichte der Stadt Florenz* (1875-80); and *Festschrift zum 500 jährigen Geburtstage Gutenbergs* (1900).

HARTZENBUSCH, härts'en-bush, Juan Eugenio (1806-80). A Spanish dramatist of the Romantic movement, born at Madrid, of a German father and a Spanish mother. He first studied theology, and then took to painting, but was forced by his father's illness to follow for some years his profession, that of a cabinet-maker, training himself meanwhile for the work of a playwright by preparing versions of domestic and foreign dramas. His success was assured from the time of the first performance of the *Amantes de Teruel*, his best-known production, and one of the most important plays of the Romantic period of Spanish literature in the nineteenth century. Highly sentimental, it brings once more upon the boards a story of sad loves which had already been treated by Artieda, Tirso de Molina, and Montalvan. Later dramas of Hartzenbusch, most of them of an historical nature, are: *Doña Mencia; Alfonso el casto* (1841); *La jura en Santa Gadea* (1845), dealing with the history of the Cid; *La madre de Pelayo* (1846); *La ley de raza*, relating to the history of the Visigothic Empire; *Vida por honra* (1858), a statement of the tragic love of the Conde de Villamediana; *El mal apóstol y el buen ladrón* (1860), a play with some of the characteristics of the *Auto sacramental;* his comedies of a Moretinian type are: *Un sí y un no; La visionaria; Juan de las Viñas; La redoma encantada; Los polvos de la madre Celestina; Las Batuecas.* Hartzenbusch also published *Ensayos poéticos y artículos en prosa*, etc. (1843), and *Cuentos y fábulas* (1861). He was a lyric poet of but modest pretensions. As editor

of the dramas of Lope de Vega, Calderon, and other masters of the *siglo de oro*, he did not possess the proper scientific and critical ability. Associated with the staff of the *Biblioteca Nacional* at Madrid, after 1844, he became chief librarian in 1862, and retained this post till his death. He was a member of the Academy since 1847. Consult his works in the *Colección de escritores castellanos* (Madrid, 1887 et seq.); Fernández-Guerra's essay on Hartzenbusch in Novo y Colsón, *Autores dramáticos contemporáneos*.

HARTZ (härts) **MOUNTAINS.** See HARZ MOUNTAINS.

HARUGARI, hä'rōō-gä'rē. A German order in the United States, named after an old Teutonic tribe. It was founded in 1847 as a protest against the anti-German sentiment then existing in the country, and had as its special objects the preservation of the German language, customs, and traditions. It was also a social, benevolent, and altruistic organization. It has at present some 300 lodges, with a total membership of about 30,000.

HARUN AL-RASHID, hä-rōōn' äl rä-shēd' (?-809). The fifth of the Abbasside caliphs. He was born either on the 20th of March, A.D. 763, or the 15th of February, A.D. 766, and in 786 succeeded his elder brother, Al-Hadi in the caliphate. The administration during a considerable part of the brilliant reign of Harun was intrusted to the Grand Vizier Yahya, head of the powerful Barmek or Barmecide family; and the energy of the administration, the enforcement of order, and the general prosperity of the country proved that Harun's confidence was not misplaced. Rebellions were suppressed, and the integrity of the Empire was preserved, saving the loss of a portion of North Africa occasioned by the rise of the Idrisites (q.v.). The capital, Bagdad, became the most flourishing city of the period. Tribute was paid to Harun from all quarters, and splendid edifices were erected by him at an enormous cost. Harun loved luxury and pleasure, was a patron of learning, poetry, and music, and his Court was the resort of the most eminent Mohammedans of the age. He was celebrated in countless songs and narratives; and is perhaps best known in the West as the caliph around whom centre the tales of the Arabian Nights. Toward the end of his reign he conceived a hatred toward the Barmecides (q.v.), due, perhaps, to jealousy of their growing influence and power; yet he suffered the reins of government to remain in their hands for some years. In 803 he caused the Vizier, his four sons, and all their descendants, one only excepted, to be executed, not even excepting his favorite Jačafar, who had been his companion in his nocturnal rambles through the streets of Bagdad. The affairs of the Empire felt the change; disorders broke out in every part of the caliphate, and treason and rebellion led to civil war. A formidable insurrection broke out in Khorassan, and Harun marched in person against the rebels. But an attack of apoplexy obliged him to remain behind in Tus, where he soon afterwards died in the month of March, 809. While Harun was an enlightened monarch, he was a thorough Oriental despot, who has been somewhat idealized in popular tradition. Consult: Muir, *The Caliphate* (London, 1891); Osborn, *Islam Under the Khalifs of Baghdad* (London, 1878); Palmer, *Haroun Alraschid* (London, 1881); Weil, *Geschichte der Chalifen* (Mannheim and Stuttgart, 1846-62).

HARU NO MIYA, hä'rụ nô mē'yä, YOSHIHITO (1879-). The Crown Prince of Japan. He was named heir apparent on November 3, 1889, and in 1900 married the Princess Sada Fudshiwara.

HARUS'PICES (Lat., 'inspectors of entrails'). Roman soothsayers. They seem to have come originally from Etruria, whence the Romans derived many of their religious institutions. Their art, *haruspicina*, which in many respects was like that of the augurs (see AUGURIES AND AUSPICES), consisted in interpreting the will of the gods by inspecting the entrails of the animals offered in sacrifice (hence they are also called *extispices*), and by observing other circumstances connected with the offerings, such as the willingness or unwillingness of the victim to come to the altar, the flame, the smoke, etc. They took indications also from earthquakes, lightning, and all other extraordinary phenomena of nature called *portenta*. The haruspices did not equal the augurs in dignity and respect; they were regarded rather as media of communication with heaven than as possessing any independent religious authority. They had no organization, like the augurs; they did not, in earlier times, at least, form a *collegium*, nor had they a *magister*. They were, however, at one time considered of great importance; but in later times their art fell into disrepute with the more intelligent portion of the Roman citizens. Some of the later emperors, especially Alexander Severus, endeavored to revive and encourage the art of the haruspices, but it was finally abolished by Constantine. Their sacred books were called *libri haruspicini, fulgurales*, and *tonitruales*. Consult Bouché-Leclercq, *Histoire de la divination dans l'antiquité* (Paris, 1879-82).

HAR'VARD, JOHN (1607-38). An English clergyman in New England, the principal founder of Harvard College, born in Southwark, London. His father, Robert Harvard, was a butcher. His mother, who married twice after her first husband's death, became possessed of considerable property, which enabled her to give John Harvard a good education, and he was accordingly sent to Emmanuel College, Cambridge University, where he graduated in 1631, studied theology, and took his master's degree in 1635. In 1637 he married Ann Sadler, the daughter of a clergyman of Sussex, and removed to New England. There he settled at Charlestown, on Massachusetts Bay, where he was admitted a freeman in August, and where he became an assistant pastor of the First Church, of which the Rev. Z. Symmes was in charge. His health soon gave way, however, and he died of consumption on September 18, 1638, after a residence in the Colony of little more than a year. By his will he left his library of 260 volumes and a sum of about £400 to the college at 'New Towne,' later Cambridge, for which the General Court of the Colony had made an appropriation of £400 in 1636. A year after the young clergyman's death, in commemoration of his benefaction, the name of Harvard was conferred upon the institution. Consult Rendle, *John Harvard* (London, 1885).

HARVARD UNIVERSITY. The oldest institution of higher education in the United States, situated at Cambridge, Mass. It had its incep-

tion in a desire of the early settlers of the Colony of Massachusetts Bay to preserve and perpetuate in their new home the classical and theological learning acquired by many of them at the University of Cambridge, and to educate the "English and Indian youth in knowledge and godliness." To this end the General Court of the Massachusetts Bay Colony voted £400 in 1636, and in the following year appointed twelve eminent men of the Colony, including Governor John Winthrop, "to take order for a college at New-Towne," which was afterwards renamed Cambridge, in honor of Cambridge University. While the organization of the institution was in progress, Rev. John Harvard, an English non-conforming clergyman, died in 1638, bequeathing to the new school his library, consisting of 260 volumes, together with half of his estate, valued at about £400. In recognition of this gift—munificent in those days—the new school was named Harvard College. The Colonial magistrates and many private persons, emulating Harvard's generosity, also contributed books, funds, and gifts in kind. The first building was erected in 1637 by Nathaniel Eaton, who also taught until 1639, when he was dismissed for misconduct. The Rev. Henry Dunster was elected president in 1640, and in 1642 the first class, consisting of nine students, was graduated. The government of the college was the same year vested in a board of overseers, consisting of the Governor, the Deputy Governor, the magistrates, the teaching elders of the "six next adjoining towns" (Cambridge, Watertown, Charlestown, Boston, Roxbury, and Dorchester), and the president of the college. In 1650 the college was formed into a corporation, consisting of the president, five fellows, and the treasurer, for the immediate administration of the financial and educational affairs of the institution, and in 1657 the charter of the corporation was so amended as to dispense with the positive assent of the overseers in matters relating to the internal management of the college, leaving, however, final jurisdiction to that body if necessary. These two governing bodies acted as checks upon each other throughout the earlier history of Harvard, and though at times their antagonism was productive of some good, restraining the too rapid advances proposed by the liberal corporation on the one hand, and preventing the overseers from using the college for partisan purposes, yet the progress of the college was much retarded by these controversies. The character of the board of overseers has been fundamentally changed by successive legislative acts, concurred in by the corporation and overseers. According to the State Constitution of 1780 it was composed of the Governor, Lieutenant-Governor, Council and Senate of the Commonwealth, the president of the college, and the ministers of the Congregational churches of the towns mentioned above. In 1810 fifteen laymen and fifteen Congregational ministers, with the president of the Senate and the Speaker of the House, all inhabitants of the State, were substituted in place of the Senate and the ministers of the six towns. In 1814 the members of the Senate were restored to membership; the act of 1834 made clergymen of all denominations eligible for membership on the board; but it was not ratified by the corporation and overseers until 1843; the act of 1851 secularized the board by containing no reference to clergymen; the act of 1865 transferred the election of members of the board from the State Legislature to persons holding the B.A., M.A., and honorary degrees from the college, who were to vote on commencement day at Cambridge; in 1880 eligibility to election as overseer was extended to non-residents of the State. Nominations are made by postal ballot, while the election is held in Cambridge on commencement day. Thus Harvard was successively freed from Church, State, and sectional control.

The administrations of Presidents Dunster, Chauncy, Hoar, and Mather, covering a period of nearly seventy years, were characterized by a constant struggle for existence on the part of the college, due to the parsimony of the government, and to the religious controversies of the liberals and orthodox. Rev. Increase Mather, who was president of the college for fifteen years, actually secured, in 1692, the passage of an act granting a new charter, placing the institution under control of the Calvinists, but the royal sanction to the instrument was withheld. In 1707 the struggle for the control of the college culminated in the confirmation of the charter of 1650, the liberals gaining control of the corporation, while the orthodox retained their influence in the board of overseers. In 1721 Thomas Hollis, an English merchant, endowed a divinity chair, expressly stipulating that the incumbent should not be subjected to any particular religious tests. The overseers at first refused to accept the gift; and when, at the instance of the corporation, they finally did accept it, the founder's wishes were disregarded by the exaction of a number of confessions from the first appointee. In 1762 an attempt was made by the orthodox party to establish a rival college in the Colony, but this was stoutly resisted by the overseers, and they succeeded in dissuading Governor Bernard from granting a charter. Fire destroyed, in 1764, the first Harvard Hall, containing the library and apparatus. The greatest loss was the founder's library, one book being rescued out of his entire collection. Sympathy for the college was awakened throughout the Colonies, which generously aided to repair the loss.

The liberal tendencies of Harvard manifested themselves on the political as well as on the religious side. The class of 1768 voted to take their degrees dressed in homespun, and the degree of LL.D. was conferred upon George Washington in 1776. Throughout the critical period of the Revolution, Harvard loyally supported the patriotic cause by converting its funds into currency, whereby its finances greatly suffered. In 1780 the new State Constitution confirmed the college charter with slight modifications, and by 1793 the college had partially recovered from its financial difficulties, its funds being then estimated at $182,000. The college after the close of the Revolution assumed its normal growth; the standard of scholarship was somewhat raised, and in 1782 a medical department was established. Under President Kirkland's vigorous administration, 1810-28, the college grew considerably. At the instance of Prof. George Ticknor, who had studied at Göttingen, a committee, with Hon. Joseph Story as chairman, was appointed to inquire into the methods of discipline and instruction at the college. The committee reported in 1824, recommending the division of the college into departments and the instituting of two classes of studies: those necessary for a degree and those which

might be taken by students merely wishing "to pursue particular studies to qualify them for scientific and mechanical employment and the active business of life." These suggestions met with strong opposition from the conservatives. A new code of laws was nevertheless drawn up the following year, organizing the 'faculty of the university,' systematizing the college administration, creating departments, and admitting special students. This marks the transition period of Harvard from a classical college modeled after the traditions of Oxford and Cambridge to a university based on the principles of European universities. The attempt at expansion, which involved an increase in expenditure, received a temporary check when, in 1824, the Legislature refused to renew the grant of the bank tax, which had netted the college, since 1814, about $10,000 annually. In 1825 the disbursements exceeded the income by about $4000, and the attendance, owing to the enforced economy and the withdrawal of aid from needy students, decreased from over 300 in 1824, to about 200. Nevertheless, the policy of expansion was continued under President Josiah Quincy, private benefactions, as usual, supplying the want of State aid. The law department, which had been established in 1817, was greatly strengthened by Mr. Nathan Dane's endowment of an additional chair, to which Joseph Story, whose works on equity and constitutional law form such an important part of the legal literature of this country, was appointed. In the modern-language department Professor Ticknor and his successor, Henry W. Longfellow, successfully offered a number of elective courses, but in other departments the attempt gradually to introduce electives did not meet with equal success. It has always been Harvard's tendency to encourage freedom of thought, and on that account it was formerly considered the nursery of Unitarians. The Harvard authorities, however, were timorous, and although some of the leading thinkers of that sect in the United States, as, for example, Emerson and Channing, were graduates of the college, yet when the former addressed the divinity students in 1838, exception was taken to some of his remarks as being too liberal. Harvard's attitude toward the slave question was decidedly conservative. Charles Sumner and Wendell Phillips, leading advocates of the abolition movement, had, however, been educated at the college, and when the final call to arms was issued, its sons were among the first to respond. To the memory of those who fell in the Civil War, Memorial Hall, one of the finest buildings of the university, and erected by the alumni at a cost of over $300,000, was fittingly dedicated in 1874. The administrations following President Quincy's resignation in 1845 were distinguished for their conservatism. The only notable additions to the university during that period were the Lawrence Scientific School and the Dental School. The struggle between the humanities and sciences, the rigid curriculum and the more liberal elective system, was about to come on in earnest, and Harvard's position in the educational world was largely decided when the great organizer and educational reformer Charles William Eliot was elected in 1869 as its president.

At the beginning of President Eliot's administration Harvard consisted of the college, wherein the courses were largely required, and a number of semi-independent professional schools, having no entrance requirements or correlation of studies. The total attendance, which was largely from New England, was, in 1869-70, 1107, including 615 college students and 13 graduates. The resident faculty numbered 78, including Lowell, Holmes, Agassiz, and Gray. The elective question was as yet in a chrysalid state, and the few elective courses offered were still in ill repute and not considered as on a par with required work. The funds of the university aggregated $2,257,989.80, and the income $270,404.63. The total value of university property was estimated at about $10,000,000. The library contained about 192,000 volumes. President Eliot reorganized and consolidated the several schools, and in 1903 Harvard University comprised eleven correlated departments as follows: (1) Harvard College, the Lawrence Scientific School, established in 1847, and which grew slowly until 1885, and the Graduate School, organized in 1872 for students pursuing original research. These have, since 1890, been under the immediate charge of the Faculty of Arts and Sciences, and include fourteen departments, offering elective courses in the sciences, mechanical and fine arts, and humanities, which lead to the degrees of B.A., B.S., M.A., M.S., Ph.D., and S.D. In 1902-03 the attendance in the college was 2109; in the Scientific School, 584; and in the Graduate School, 316. In addition to the regular courses offered by the faculty, persons holding the Ph.D. or S.D. degree are authorized to give courses either gratuitously or at a stipulated fee, in the same manner as the docents at the German universities. Evening readings, lectures, and concerts, including those of the Boston Symphony Orchestra, have become a permanent feature at the university. For graduates engaged in original research, 41 fellowships, yielding from $300 to $1000, are available. There are also 205 scholarships open to all students under this faculty, besides several special funds for the assistance of needy students. (2) The Law School, established in 1817, and reorganized in 1872 by Professor Langdell, who first introduced the inductive or case method, confers the LL.B. degree, and had, in 1903, an attendance of 640. (3) The Medical School, established in 1782, and the Dental School, founded in 1867, united since 1899 under the faculty of medicine, and located at Boston. They confer the M.D. and D.D.S. degrees, and had, in 1903, an attendance of 445 and 112, respectively. (4) The Divinity School, formally organized in 1819, is non-sectarian, and confers the degree of S.T.B. Under certain specific conditions, its students may also earn the M.A. and Ph.D. on recommendation of the faculty of arts and sciences. Its attendance is small. (5) The Bussey Institution, a scientific school of agriculture and horticulture, the only school to which there are no formal entrance requirements, was organized in 1871, and is situated at Jamaica Plain, about five miles from Boston. It confers the degree of Bachelor of Agricultural Science. (6) The Arnold Arboretum was founded in 1872 under the will of James Arnold, for scientific research in arboriculture, forestry, and dendrology, and has a museum for Massachusetts trees and shrubs. It occupies about 220 acres in West Roxbury. (7) The University Library, including the separate libraries of the several schools and

departments, aggregates 576,900 volumes and 250,000 pamphlets, the largest collection being at Gore Hall, which contains 387,100 volumes. (8) The University Museum, situated at a short distance from the main buildings, consists (a) of the Museum of Comparative Zoölogy, founded in 1859 by private subscription and by the State, and greatly enriched by the collections of Prof. Louis Agassiz and the gifts of his son; (b) the Peabody Museum of American Archæology and Ethnology; (c) the Botanical Museum; and (d) the mineralogical and geological sections. The Semitic, the Fogg Art, and the Germanic Museums are each located in separate buildings. (9) The Botanic Garden, founded in 1807, occupies about seven acres, on which are cultivated about 5000 species for scientific purposes. (10) The Gray Herbarium includes the famous collection of Prof. Asa Gray, presented to the university in 1864. (11) The Astronomical Observatory, established in 1843, maintains a station near Arequipa, Peru, and a series of meteorological stations crossing the Andes at elevations varying from 100 to 19,200 feet.

In 1879 the solution of the question of higher education for women was partially begun by Harvard professors and instructors, with the organization of the Society for the Collegiate Instruction for Women. In 1894 the name of the society was changed by the General Court of Massachusetts to Radcliffe College (q.v.), and permission was given it to confer the ordinary collegiate degrees subject to the approval of a board of visitors, composed of the president and fellows of Harvard College, under whose direction and control Radcliffe was then placed. Its immediate government is in charge of a council and an academic board, of which bodies the president and dean of Harvard College are members. Instruction is given mainly by the faculty of Harvard College, and sixteen scholarships are available for worthy students. Its attendance is approximately 450. The government of Harvard University is vested in (1) a board of overseers, of which the president and treasurer are members ex-officio, and five of whom are elected annually for a term of six years; (2) the corporation, composed of the president, treasurer, and five fellows—a self-perpetuating body, having charge of the management of the material and educational interests of the university; (3) the university council, composed of the members of the several faculties, with jurisdiction on educational questions that concern more than one faculty; and (4) the faculties of the several schools.

Students under any of the faculties may register in any course in the university, a provision which tends to bind more closely the interests of the several schools. The entrance requirements were gradually raised, until 1890, when the limit was practically reached; and sciences and modern languages are now accepted at the college in lieu of one ancient language. These changes have had a very wholesome effect in forcing preparatory schools in turn to raise and broaden the standard of their courses of study. The professional schools, with the exception of the Dental School, now require matriculants to hold a collegiate degree. The question of shortening the college course has not been definitely settled. Industrious students may, however, so arrange their work as to complete the college course in three years.

The university maintains a summer school under the faculties of arts and sciences, theology, and medicine, with courses designed mainly for teachers. In the summer of 1902, 945 students were enrolled. The schools issue a number of important publications, partly independent journals and partly stated reports in scientific periodicals. Important work is done by students in clubs connected with the various departments. Athletic sports are regulated by a committee representing the faculty, the graduates, and undergraduates. Physical training is provided by the Hemmenway Gymnasium, built in 1878, and by two athletic fields, containing twenty-four acres. The Harvard Union, an elaborate students' clubhouse, the gift of Henry Lee Higginson, was opened in 1901. In 1886 attendance at chapel was made voluntary, and, contrary to expectations, the religious side of the university has not suffered thereby. Five eminent preachers are annually appointed, without regard to sect, to conduct daily services at the chapel, and seats also are provided for students at the local churches at the expense of the university. Religious societies find ample accommodations for their meetings at the Phillips Brooks House. The grand total attendance of the university in 1903 was 5206, with a faculty numbering 534. The university property, in 1902, was estimated at $20,914,541, and consisted of grounds and buildings valued at $5,300,000, scientific apparatus, etc., valued at $1,500,000, and productive funds of $14,114,541. The income, exclusive of gifts and bequests to the amount of $1,095,737, was $1,436,292.

The publications of the university, issued officially or indirectly, are: *Harvard Oriental Series; Harvard Studies in Classical Philology; Studies and Notes in Philology and Literature; Harvard Historical Studies; Quarterly Journal of Economics; Harvard Law Review; Annals of the Observatory of Harvard College; Annals of Mathematics, New Series; Contributions from the Cryptogamic Laboratory; Publications of the Museum of Comparative Zoölogy; Contributions from the Zoölogical Laboratory; Publications of the Peabody Museum of Archæology and Ethnology; The Harvard Graduates' Magazine.*

The presidents of Harvard since its inception have been: Henry Dunster, 1640-54; Charles Chauncy, 1654-72; Leonard Hoar, 1672-75; Urian Oakes, 1675-81; John Rogers, 1682-84; Increase Mather, 1685-1701; Samuel Willard, 1700-07; John Leverett, 1708-24; Benjamine Wadsworth, 1725-37; Edward Holyoke, 1737-69; Samuel Locke, 1770-73; Samuel Langdon, 1774-80; Joseph Willard, 1781-1804; Samuel Webber, 1806-10; John Thornton Kirkland, 1810-28; Josiah Quincy, 1829-45; Edward Everett, 1846-49; Jared Sparks, 1849-53; James Walker, 1853-60; Cornelius Conway Felton, 1860-62; Thomas Hill, 1862-68; Charles William Eliot, 1869—.

Consult: Pierce, *History of Harvard University, 1636-1766* (1833); Quincy, *The History of Harvard University* (1840); Eliot, *A Sketch of the History of Harvard University* (1848); Thayer, "Historical Sketch of Harvard University," in the *History of Middlesex County* (1890); Hill, *Harvard College by an Oxonian* (1895); *Annual Report of the President and Treasurer of Har-*

vard College; and *The Harvard University Catalogue.*

HARVEST AND HARVESTING (AS. *harfest*, OHG. *herbist*, Ger. *Herbst*; probably connected with Lat. *carpere*, to pluck, Gk. καρπός, *karpos*, fruit). The season and the process of gathering ripened crops. Formerly the terms were applied to the time of reaping and garnering cereals, but with the growth and extension of other branches of agriculture, especially in the fruit industry in America, they are more loosely applied, as 'hay harvest,' 'cherry harvest,' 'potato harvest,' etc. As in other agricultural lines, the development of the methods of harvesting has been marked, and during no period so strikingly as during the last half of the nineteenth century. In former times the single-handed sickle and two-handed scythe, which appeared somewhat later, seem to have been the sole implements for cutting the stalks of grain. In using the sickle the operator would catch the severed stems with his free arm, and when he had obtained enough for a sheaf, would either stop to bind the bundle or would leave it to be tied by another; in using the scythe he would leave the stalks somewhat disarranged in a more or less uniform row for the sheaf-maker to work upon; in using the cradle—a much more recent invention, which consists of a scythe to the handle of which is fastened a set of three or more fingers of light but strong wood as long as the blade and parallel with it—the skillful operator would leave the stalks all parallel as they were caught by the cradle-fingers when the blade severed them. A feature of primitive methods of harvesting was the gleaner, who went over the field to pick up the heads of grain overlooked by the reapers. Methods of separating the grain from the straw and the chaff were not less crude than those of cutting. The sheaves were spread upon a floor, which was often the bare rock or even the earth, and animals yoked to heavy planks studded with flints or iron were driven across it until the separation of the grain from the stalk seemed complete. Then the straw was removed with crude forks, and the chaff blown away by the wind or by hand fans.

In contrast with this picture of primitive agriculture the present stands out boldly. The slow, laborious, uncleanly methods of the ancients have mostly disappeared among civilized peoples, but there are countries where the traveler may find them still in vogue, though perhaps somewhat modified. Even in sections of enlightened lands many of the modern implements and methods are unknown. Even within fifty miles of the city of New York there are farms upon which the grain is still reaped with the cradle. But such cases are exceptional. The cradle has given place to the mower, which was at first used only in cutting grass for hay, but which genius soon adapted to cut grain and lay it in piles of convenient size for binding into sheaves. The same inventive spirit produced the self-binder, a still more highly modified mower which not only does all the work of the reaper, but ties the sheaves with twine or wire. Yet more recently has appeared the heading-machine, which, drawn by a score or more of horses or propelled across the field, severs only the heads of the plants, and threshes and winnows the grain and places it in sacks ready for market. On many of the Western wheat farms, more especially of the arid districts, this machine has supplanted not only the reaper, but the threshing-machine, since it performs the office of each. Yet the threshing-machine is still popular where grain must be allowed to stand in the shock to dry for a few days after cutting. This machine has long since replaced the flail and the fanning-mill, combining as it does the purpose of both. Formerly it was operated by horse-power, but is now generally driven by a portable engine which, in many instances, has also traction gearing, and takes the place of horses in drawing the machine from farm to farm. A revolution has also taken place in hay-making. Hand labor has been reduced to a minimum. The mower has supplanted the scythe in cutting; the hay-tedder, which tosses the grass as it lies in the field, has replaced the hay-fork in curing; the hay-loader, drawn behind the wagon to be loaded, has largely taken the place of loading by hand forks, and the horse-power hay-fork, which will dispose of a large load of hay in three or four forkfuls, has become a common implement on farms where stock-raising or dairying are leading features. In fact, throughout the whole domain of agriculture the methods of harvesting, so far as has been possible, have been improved to a remarkable extent. Corn, beets, beans, indeed, nearly every important crop has its special harvesting machinery. Cotton is the most notable exception; machines adapted to its method of ripening seem impossible.

No less remarkable have been the developments in methods of fruit-harvesting. It is highly probable that in all countries methods were at first crude and wasteful. In America, during the first half of the nineteenth century, apples rarely arrived in market except in bulk by the wagon-load, and peaches at first were treated no better. During the last half, reform has taken place; the former rarely arrive, except in local markets, in any other package than the barrel, and the latter, it is probable, never in bulk as formerly, but almost always in baskets. In olden times when there was little or no market for fruits, except in the towns and their immediate neighborhood, the tree-fruits were shaken or beaten to the ground, a method still popular with those apples the chief end of which is cider. But with the development of a fresh-fruit market, increased care was taken to avoid bruising. With increasing prosperity the demand for fine specimens increased, and the grower was compelled not only to produce a superior article, but he was forced to present it for sale in an attractive package. All details of modern fruit harvest depend upon the peculiar demands of the market, the distance the product must be shipped, the means of transportation, and the shipping qualities of the kind or the variety of fruit. These four factors determine the time of picking, which, with perishable fruits, especially when sent to distant markets, is several days before maturity, a stage learned only by experience with the individual kind or even variety. In general, for shipping to distant markets, strawberries are gathered when they have colored well; red raspberries when they become soft; peaches when an experienced picker detects, with the ball of his thumb, a very slight softness of the tissue; plums while still too green to be pleasantly edible; pears when, upon lifting the fruit, the twig and the stem separate without either one breaking; apples when they readily

part from the stem by a twist of the fruit. For local markets the fruit may be allowed to become riper. Again, these factors determine the style and size of the package and many other details which, since they properly belong to the sale of fruit rather than to harvesting, will be found discussed under the title MARKETS AND MARKETING. See also HORTICULTURE; FRUITS, CULTIVATED; and articles upon individual fruits.

HARVEST-FISH (so called from the time of its annual appearance). An edible fish of the rudder-fish family (Stromateidæ), also called 'butter-fish' or 'dollar-fish,' and 'lafayette.' The common Northern species (*Rhombus triacanthus*) is about seven inches in length; is related to and resembles in its compressed oval shape the pompano; and when first taken from the water displays brilliant shifting, iridescent colors. They are an excellent pan-fish, tasting like mackerel,

SOUTHERN HARVEST-FISH.
(*Rhombus paru*).

and are extensively caught off New Jersey and New England in midsummer (at harvest-time). A southern species (*Rhombus Paru*) ranges from Chesapeake Bay to Brazil, is greenish above and golden below, and is a favorite in the Virginia coast markets. Other species in the West Indies and California are highly prized.

HARVEST-FLY. The popular name in the United States for several species of cicada, because they make their appearance in harvest. See CICADA.

HARVEST-MAN, DADDY-LONG-LEGS, or GRANDFATHER GREYBEARD. An arachnidan of the order Phalangidæ. These creatures are of world-wide distribution, and are very common in most parts of the United States and in South America. One blind form inhabits Mammoth Cave, Kentucky. The majority of the family may be recognized by their short bodies and long, stilt-like legs, bowed or elevated in the middle, so that the body of the insect is almost on the ground. They have a very characteristic and disagreeable smell. The eyes are two in number, and the mandibles are pincer-like. There is only one pair of spiracles on the lower side of the body at the junction of the cephalothorax and abdomen. The crane-flies of the dipterous family Tipulidæ are called 'daddy-long-legs' in Europe, and should not be confused with these arachnida. The harvest-men are said to feed on small insects, especially aphids; but C. M. Weed states that they are much more apt to feed on insects found dead than to kill living ones. They are abundant in woods and fields from middle summer until late autumn, and are likely to collect in sheds, outhouses, barns, and even houses, or on bare rocks or tree-trunks. Very few species survive the winter as adults. Most of them lay their eggs in the ground in the autumn.

BIBLIOGRAPHY. Weed, "A Descriptive Catalogue of the Phalangiinæ of Illinois," in *Bulletin of the Illinois State Laboratory of Natural History*, vol. ii. (Urbana, 1884-88); Say, "Account of the Arachnides of the United States," in *Journal of the Philadelphia Academy of Natural Sciences*, vol. ii. (Philadelphia, 1821); Wood, "On the Phalangidæ of the United States," in *Essex Institute Bulletin*, vol. vi. (Salem, 1874); Wood, *Canadian Entomologist*, vol. xvi. (London, 1874).

HARVEST-MITE. See MITE.

HARVEST MOON. The moon does not rise at the same time every night, on account of her changing position in the sky caused by her orbital motion around the earth. Each night the rising is later; and the *retardation*, as it is called, averages about 50 minutes. In the latitude of New York the maximum retardation is 1 hour 17 minutes, and the minimum, 23 minutes. In higher latitudes the range of the retardation may be even greater, and the minimum retardation may descend to *nil*. When the retardation is a minimum at the time of full moon, farmers have the advantage of strong moonlight almost all night on several successive nights; for, the retardation being small, the moon rises at nearly the same time each night as she does on the night of full moon. As this state of affairs is very favorable to harvesting, this full moon is called the harvest moon. It is always the full moon occurring nearest the date of the autumnal equinox (q.v.), September 22d.

HARVEY. A city in Cook County, Ill., 20 miles south of the Chicago court-house, on the Illinois Central, the Cleveland, Cincinnati, Chicago and Saint Louis, and other railroads. It is a residential suburb of Chicago, and also an industrial centre. The principal manufactures include mining and ditching machinery, gas stoves, automobiles, and railroad supplies. Harvey, founded in 1891, and incorporated the succeeding year, is governed by a mayor elected every two years, and a council. Population, in 1900, 5395.

HARVEY, GABRIEL (c.1545-1630). An English author. He was born at Saffron Walden, and educated at Cambridge, where he took his B.A. degree in 1570, and was elected fellow of Pembroke Hall a few months later, and master of Trinity Hall in 1585. He passed most of his life at the university. He was involved with Robert Greene and Thomas Nash in one of the most notorious personal controversies of the time, to which his own contributions are specimens of the most abusive style of Elizabethan prose. He is best known as the friend of Sidney and of Spenser, who has celebrated him under the name of Hobbinol in the *Shepheard's Calendar*, and as a leading member of the school which vigorously endeavored to enforce upon Englishmen the strict rules of classical metre and dramatic construction. He asserted that he was the first English poet to naturalize the dactylic hexameter, and he induced Spenser to abandon for a time the use of rhyme. Consult: his *Works*, ed. A. B. Grosart, privately printed in eight volumes (London, 1884-85), and *Letter Book*, ed. Scott (ib., 1884).

HARVEY, Sir George (1806-76). A Scottish historical and landscape painter. He was born at Saint Ninians, near Stirling, in February, 1806. Displaying a taste for drawing, he was at the age of eighteen placed in the school of the Trustees' Academy, Edinburgh, where he made rapid progress. In 1826, when the Royal Scottish Academy was instituted, he was elected an associate, and in 1829 an academician. He was a constant contributor to the Academy's exhibitions, and many of his works are well known through the medium of engravings. The principal of these are: "Covenanters Preaching," "Battle of Drumclog," "The First Reading of the Bible in Old Saint Paul's," "The Curlers," "Columbus Discovering America," and "Quitting the Manse." Harvey did not confine himself to historical art, some of his most successful works being representations of Scotch scenery. Among the finest of the landscapes are: "The Enterkin," "Ferragon," "Sheep-Shearing," "Glen Dhu Arran," and "Inverarnan, Loch Lomond." They are remarkable as representations of pastoral peace. Harvey was elected president of the Royal Scottish Academy in 1864, and knighted in 1867. He died in Edinburgh, January 22, 1876. Compare his *Notes on the Early History of the Scottish Academy* (London, 1873); his *Recollections* (London, 1888).

HARVEY, Sir John. A Colonial Governor of Virginia. He first visited the province as one of the commissioners sent out by James I. in 1623 to get evidence which would justify him in suppressing the Virginia Company. Appointed Governor after Yeardley's death, he began his administration in 1629, and soon made himself thoroughly detested by the colonists, for he not only favored the interests of individuals, such as Lord Baltimore, at the expense of Virginia, but filled his own pockets by imposing unusual fines on the settlers, all fines being by royal warrant a perquisite of the Governor's. In 1635 an assembly was called to hear complaints against him, and on April 28th the council met and decreed "Sir John Harvey thrust out of his government, and Capt. John West acts as Governor till the King's pleasure known." Sir John went at once to England and appealed to Charles I., who reinstated him, and refused even to listen to the delegates who had been sent over to present the case of the colonists. Two years after his return to Virginia, however, the King relieved him and appointed a new Governor in his place.

HARVEY, Sir John (1778-1852). A British soldier. He entered the army at a very early age, and saw service in many parts of the world. In 1812 he was appointed deputy adjutant-general of the army in Canada, and was received with great favor by Sir George Prevost, who asked his advice on the defense of the wide frontiers of Canada against the United States forces. He was present at the unsuccessful defense of Fort George (May 27, 1813), but escaped with General Vincent and most of the British troops. On June 6th he led an attack on General Dearborn's forces at Stony Creek, and later in the year was adjutant-general of the British army at the battle of Chrystler's Farm. Upon the close of the War of 1812 he returned to England, and at the battle of Waterloo was on the staff of the Duke of Wellington. In 1836 he was once more in America, this time as Governor of Prince Edward Island. From 1837 to 1841 he was Lieutenant-Governor of New Brunswick, and in 1846 was appointed Governor and commander-in-chief of Newfoundland, but remained there only a short time before he was made Lieutenant-Governor of Nova Scotia, which office he held until his death.

HARVEY, Moses (1820-1901). A Canadian author, born near Armagh, Ireland, and educated at Belfast College in arts and theology. In 1852 he left his charge in Maryport, Cumberland, England, and became pastor of the Free Presbyterian Church of Saint John, Newfoundland, from which he retired in 1878. Harvey made special studies of the geography and history of Newfoundland, contributed to the *Encyclopædia Britannica* (9th ed.) articles on "Seal Fisheries," "Newfoundland," and "Labrador," and published: *Poetry and Literature of the Bible* (1852); *Lectures, Literary and Biographical* (1864); *Comack's Journey Across Newfoundland* (1873); *Across Newfoundland with the Governor* (1879); *Newfoundland, the Oldest British Colony* (1883); *Text-Book of Newfoundland History* (2d ed. 1890); *Newfoundland as It Is* (1894); and *Newfoundland in the Jubilee Year* (1897).

HARVEY, William (1578-1657). An English anatomist, celebrated as the discoverer of the circulation of the blood. He was born at Folkestone, in Kent, of a London family of great respectability. When he was fourteen years old he was sent to Caius College, Cambridge, where he was admitted as a pensioner in 1593. After five years' study at the university he traveled through France and Germany, and decided to study medicine at Padua. Here he came under the influence of some of the best teachers of the time, notably Fabricius (q.v.). From this master the young student learned of the existence of the valves in the veins. Having obtained his medical degree in 1602, he returned to England, and began to practice his profession in London. He was admitted a candidate of the London College in 1604, and was elected a fellow in 1607. Two years later he was appointed physician to Saint Bartholomew's Hospital, and in 1615 was made professor of anatomy and surgery. His discovery of the circulation of the blood he perfected in 1616. He was appointed physician extraordinary to James I. in 1618, and was physician to Charles I. from 1632 to 1646. He accompanied the King in the battle of Edgehill in 1642, and during this engagement the Prince and the Duke of York were intrusted to his care. In 1645 he was, by the royal mandate, elected warden of Merton College, succeeding Dr. Nathaniel Brent. During his residence at Oxford he made many experiments, and pursued researches connected with the subject of generation. In 1646, upon the surrender of Oxford to Parliament, he went to practice his profession in London. In 1651 the results of his investigations on the development of the chick, in which he was assisted by Rev. George Bathurst of Trinity College, were given to the world. In 1653 Harvey built a library and museum, which he presented to the members of the College of Physicians. He resigned his professorship of anatomy and surgery in 1653, at the age of seventy-five, and he died on June 3, 1657, of paralysis, which succeeded several years of suffering from gout.

Harvey's description of the course and circu-

lation of the blood met with great opposition, founded perhaps upon jealousy, and the ridicule and unwarranted attacks resulted in a great diminution of his practice. In time, however, he had the satisfaction of seeing his doctrine accepted entire; but the labor and devotion of twenty-five years were requisite for the attainment of the final result. Six diagrams giving views of the circulatory system of the human body, life-size, with which Harvey illustrated his lectures, are still preserved in the museum of the Royal College of Physicians. Previous to Harvey's time, it was believed that the blood was constantly in motion, but the arteries were believed to contain air only, because they were found to be empty after death. Others were close to the discovery of the course of the blood, but it was reserved for Harvey to comprehend and elucidate the whole matter. Although he communicated his discovery to his pupils as early as 1619, it was not till 1628 that his work *Exercitatio de motu Cordis et Sanguinis in Animalibus* was published at Frankfort, as a small quarto of 72 pages, called by Haller *Opusculum aureum*. The best edition of it was published at Leyden (1739). Among other works are his *Exercitationes de Generatione Animalium, quibus accedunt quædam de Partu, de Membranis ac Tumoribus Uteri, et de Conceptione* (cir. 1651; also Leyden, 1737); and *Exercitationes Duæ Anatomicæ de Circulatione Sanguinis* (Oxford [?] cir. 1645). A complete edition of Harvey's works in Latin was published in 1766 by the College of Physicians of London, including his *Treatise on the Circulation*, with the prefaces of the first edition of 1628; his *Exercitations* addressed to Riolan; his work on the *Generation of Animals;* the *Account of the Dissection of Thomas Parr;* and *Nine Epistles of Harvey* addressed to various persons; together with a copy of the diploma of doctor of medicine conferred upon Harvey by the University of Padua. Prefixed to this collection of his works is a *Life of Harvey*, by Lawrence. Consult Willis, *Life of Harvey* (London, 1881). See PHYSIOLOGY.

HARVEY, WILLIAM HENRY (1811-66). An Irish botanist, born at Summerville, near Limerick. He received the bent toward his specialty from the schoolmaster with whom he studied in Kildare. A field naturalist, he began his researches in his native land, but they extended to South Africa (1835-42), and for the last ten years of his life he was professor of botany in Dublin University. Travels in America, India, Australia, and the South Seas had augmented his botanical knowledge, and he was an authority especially in algæ, though he disputed the Darwinian hypothesis. He published: a *Manual of British Algæ* (1841); *Phycologia Britannica, a History of British Seaweeds* (1846-51); *Nereis Boreali-Americana* (1852-58); *Phycologia Australica* (1858-63); and other works.

HAR'VEYIZED STEEL, HARVEY PROCESS. See ARMOR PLATE.

HARWICH, här'ĭj. An ancient seaport, market-town, and municipal borough in Essex, England, at the mouth of the Stour, on the North Sea, 70 miles northeast of London (Map: England, H 5). Its important industries are fisheries, ship-building, and cement and manure manufacturing. Its coasting and foreign trade with Germany, Denmark, and Holland is considerable. It exports cement, fish, manure, ironware, machinery, leather, etc., and imports grain, silk, woolen and cotton goods, timber, and tobacco. The harbor is commodious, safe, and strongly fortified. An average of 3500 vessels enter and clear a gross tonnage of 1,800,000 annually. The total annual value of its imports and exports during the five years ending in 1900 was £22,000,000 ($110,000,000). The town is pleasantly situated on an elevated promontory, and is a favorite sea-bathing resort. It has tramways, and is supplied with water, gas, and electric lighting. Harwich was a Roman station, and a great Danish military depot. In 885 it was the scene of a great naval conflict between the Danes and King Alfred's fleet, and in 1666 of another between the Dutch and English. It was made a Parliamentary and municipal borough by Edward II. in 1318. Population, in 1891, 8200; in 1901, 10,019.

HAR'WOOD, ANDREW ALLEN (1802-84). An American naval officer, born at Settle, Pa. He entered the United States Navy, and in 1828 was appointed to the receiving-ship *Philadelphia*. In 1835-37 he served in the Mediterranean Squadron, in 1848 was promoted to be commander, and in 1855 to be captain. In 1862 he was appointed chief of the Bureau of Ordnance and Hydrography, and in 1863 commandant of the Washington Navy Yard, with rank of commodore. In 1869 he was retired with rank of rear-admiral. He published *Law and Practice of United States Navy Courts-Martial* (1867), and edited *Summary Courts-Martial*.

HARZER, här'tsĕr, PAUL HERMANN (1857—). A German astronomer, born at Grossenhain (Saxony). After study in Leipzig, Berlin, and Rome, he was assistant at the Leipzig Observatory from 1878 to 1881; was appointed observer there in 1882, and in the same year became a lecturer in the university. From 1887 to 1897 he was director of the Archducal Observatory at Gotha, and in the latter year was appointed director of the Kiel Observatory. In theoretical astronomy he made numerous investigations of importance, results of which appeared at various times in scientific journals, particularly in the *Astronomische Nachrichten*, his contributions to which include: "Eine neue Methode die negativen und ungeraden Potenzen der Entfernungen der Himmelskörper zu entwickeln" (vol. cii., 1882) and "Untersuchung über die astronomische Strahlenbrechung auf Grund der Differentialgleichungen der elastischen Lichtbewegungen in der Atmosphäre" (vols. civ., cvii., 1882, 1883).

HARZ (härts) **MOUNTAINS.** An isolated mountain range in Northern Germany, extending between the rivers Saale and Leine, through Prussia, Brunswick, and Anhalt (Map: Germany, D 3). Its length from Mansfeld on the southeast to Seesen on the northwest is about 60 miles, and its total area about 900 square miles. The range, formed by a flatly arched uplift, rises sharply from the surrounding plain, and is dissected by numerous stream valleys. The Upper Harz, comprising the northwestern section, has an elevation of from 1000 to 3000 feet, and culminates in the Brocken, 3747 feet. In the southeastern or Lower Harz region, the elevations rarely exceed 1000 feet. The mountain slopes are heavily wooded with pine, oak, and

beech, but the summits, owing to the raw climate, support only a stunted growth of vegetation. The higher peaks are enveloped in fog during a large part of the year, and the rainfall is heavy. Geologically, the range consists of Devonian and Carboniferous strata, which have been broken through by eruptive granites, diabase, and porphyry. The mineral resources are of great importance, copper, silver, lead, and iron being produced at several localities. Mining was carried on as early as the twelfth century, but the deposits are still far from exhausted. Clausthal, in the Upper Harz, is the seat of a famous mining academy. The region is well patronized by tourists, as it is rich in historic and legendary interest, as well as in scenery. See BROCKEN.

HARZREISE, härts'rī-ze, DIE (Ger., journey through the Harz). A celebrated autobiographical narrative by Heinrich Heine (1824), based on an actual tour by the author, of which the work is a picturesque account.

HASAN, hä'san, AND **HOSEIN,** hō-sān'. Two grandchildren of Mohammed, sons of his youngest daughter, Fatima, and Ali. After the assassination of Ali (q.v.), his adherents at Cufa recognized his eldest son Hasan as caliph, while Moawiya asserted his claim to the entire Moslem Empire, and gathered a powerful army to invade Irak. Hasan, a man of little courage, with more taste for the harem than the camp, agreed to abdicate at the first taste of war, and retired to Medina (661). He was poisoned by one of his wives eight years later. On the death of Moawiya (680) the people of Cufa made overtures to Hosein, who was then at Mecca visiting him, to claim the caliphate in opposition to Yezid, Moawiya's son. With a small force he proceeded to Irak. Yezid, well informed of the movement, had made ample preparations to receive him, and he was slain at Kerbela on the 10th of Muharram, 681. The fate of the house of Ali made a deep impression on the Moslem world. The Shiites (see MOHAMMEDAN SECTS) still refuse to recognize the claims to the caliphate of any except Ali and his sons. They observe the 10th of Muharram as a day of mourning, and devote the nine preceding days of the month to the memory of the martyrs. The so-called 'miracle play,' a dramatic representation of the history of Hosein, is given, and the spectators become wrought up to the most extravagant expressions of sorrow, and the highest pitch of fanatical enthusiasm. In one of its forms the play lasts for the entire ten days, culminating on the last day in the representation of the death of Hosein. Consult: Muir, *Annals of the Early Caliphate* (London, 1883); Pelly, *The Miracle Play of Hasan and Hosein, Collected from Oral Tradition* (London, 1879).

HAS'CALL, MILO SMITH (1829-1904). An American soldier, born in Genesee County, N. Y. In 1846 he moved to Goshen, Ind., and two years later was appointed a cadet at the United States Military Academy. After two years' service in the Regular Army he resigned his commission, and went back to Goshen, where he became a lawyer and filled various political offices. At the outbreak of the Civil War he enlisted as a private, but was soon appointed aide-de-camp to General Morris, with the rank of captain, and assisted in organizing six volunteer regiments. On June 12, 1861, he was made colonel of the Seventeenth Indiana Volunteers, and took part in the successful West Virginia campaign. He was commissioned brigadier-general of volunteers on April 25, 1862. Having been transferred to the Army of the Cumberland, he was put in command of a brigade which fought through the Tennessee campaign (October, 1862, to March, 1863). At the battle of Murfreesboro (December 31, 1862-January 3, 1863) he had command of the Sixth Division under Major-General Crittenden. From June to August, 1863, he was in command of the District of Indiana, and afterwards commanded a division in the Army of the Ohio, which took part in the defense of Knoxville (November to December, 1863). The next year he commanded the Second Division of the Twenty-third Army Corps in the Army of the Ohio during the invasion of Georgia. He resigned on October 27, 1864, and returned to Goshen, where he engaged in banking, but later entered the real estate business in Chicago.

HASCHKA, häsh'kä, LORENZ LEOPOLD (1749-1827). An Austrian poet, born at Vienna. In 1798 he became professor of æsthetics in the Theresianum; he was custodian of the university library, and wrote many lyrics, of which the best-known is the Austrian national hymn, "Gott erhalte Franz den Kaiser," set to music by Haydn.

HASDEN, häs'dĕn, BOGDAN PETRICEICU (1838—). A Rumanian poet, historian, and philologist. He taught history in the gymnasium of Jassy, and in 1875 became professor of comparative philology and director of the national archives at Bucharest. His literary labors include dramas, satiric romances, and editorial work, especially on the *Revista Noua*. The most important of his philological works is *Etymologicum Magnum Romaniæ* (1886).

HAS'DRUBAL (Phœnician, whose help is Baal, Gk. *'Ασδρούβας, Asdroubas*). A name of frequent occurrence in Carthaginian history. The more important characters who bore the name follow: (1) Son of Hanno, a general during the First Punic War, who took the field against Regulus in B.C. 256, and met with signal defeat. He was afterwards sent to Sicily with a large army and 140 elephants, but accomplished nothing during a two years' stay in the island, and was at length totally overthrown at Panormus (Palermo) by the Roman consul Metellus in B.C. 250, and on his return to Carthage was put to death for his lack of generalship. (2) Son-in-law of the great Hamilcar Barca (q.v.), an important statesman of the period between the First and Second Punic wars, and a constant ally of his father-in-law and the popular party in Carthage. After demonstrating his military ability in several minor campaigns, he was given the chief control in Spain, where he soon proved his still greater administrative and diplomatic power. He founded the city of Carthago Nova (Cartagena) as a port of communication with the mother city, and also as a convenient centre for the silver-mines which contributed immensely to the Carthaginian resources; and he was so successful in winning over or subduing the Spanish tribes that he brought almost the whole peninsula under his sway. He was assassinated by a revengeful slave in B.C. 221. (3) Son of Hamilcar Barca, and brother of the great Hannibal, who left him in command in Spain when he began his famous

march across the Alps to Italy (B.C. 218). For several years he carried on operations in Spain against the Roman forces under the two Scipios, but without decisive results, although supported by reënforcements under Himilco, Mago, and Hasdrubal, son of Gisco (see below). In 212, however, they gained a great victory over the Romans, in which Publius Scipio was slain; but the Romans regained the advantage in the following year by the capture of Carthago Nova, the enemy's base of supplies. Shortly after, Hasdrubal gathered a greater force with the intention of following Hannibal's example and invading Italy. He crossed the Alps in B.C. 207 and laid siege to Placentia (Piacenza)—a fatal step, as delay gave the Romans an opportunity to attack him before he could join with Hannibal. A bloody battle was fought on the banks of the Metaurus, and Hasdrubal fell in the thick of the fight. (4) Son of Gisco, mentioned above as one of the generals sent to Spain to assist Hasdrubal No. 3. Afterwards he took charge of the military operations in and around Carthage; and when Scipio came into Africa with a large army (B.C. 204), the diplomacy of Hasdrubal won over the assistance of Syphax, the Numidian King, which Scipio also had endeavored to gain. (See SOPHONISBA.) But the allied forces were mercilessly annihilated by Scipio, who hemmed them within their burning camp; but few, including the two generals, escaped. Hasdrubal met a violent death in Carthage for his ill success. (5) A general of the Third Punic War. For his ill success in war against the Numidian King Masinissa, he had been banished from Carthage, but was recalled to take the command in the last struggle against Rome (B.C. 149). His arbitrary and despotic command alienated many from him, and notwithstanding the heroism of the defenders, the persistence of the Roman attack led to the fall of Carthage (B.C. 146), when Hasdrubal fled to Scipio's camp, and was made prisoner. He was led in triumph at Rome, and allowed to pass his remaining days in obscurity in Italy.

HASE, hä'ze, KARL AUGUST VON (1800-90). An eminent theological writer of Germany. He was born at Steinbach, in Saxony, August 25, 1800, and studied theology at Leipzig and Erlangen. He became, in 1823, privat-docent at Tübingen, but was for political reasons, after a tedious trial, confined for ten months in the fortress of Hohenasperg, during which time he produced a theological novel, *Die Proselyten* (1827), and a *Lehrbuch der evangelischen Dogmatik* (1826, 6th ed. 1870). Released in August, 1825, he went to Dresden and did literary work. In 1828 he became privat-docent at Leipzig and in 1830 professor of philosophy in Jena, where his lectures on dogmatics and the life of Christ proved especially attractive. His *Leben Jesu* (1829, 5th ed. 1865; trans. *The Life of Jesus*, 1881), which appeared six years before Strauss's, proposed as its aim to show "how Jesus of Nazareth, according to divine destination, by the free act of His own spirit, and by the opportunities of His time, became the Saviour of the world." He opposed modern supernaturalism in *Die Leipziger Disputation* (1827) and extreme rationalism in *Theologische Streitschriften* (1834-37) and *Die Tübinger Schule* (1855). His *Hutterus Redivivus* (1827, 10th ed. 1862) seeks to do justice to the old Lutheran dogmatics in contrast with modern systems, by exhibiting its harmonious completeness. Besides his *Lehrbuch der Kirchengeschichte* (1834, 11th ed. 1886), which has been translated into English (*A History of the Christian Church*, from the 7th ed., New York, 1855), Hase treated special portions of Church history in *Die beiden Erzbischöfe* (1859); *Neue Propheten* (1851); *Franz von Assisi* (1856); *Das geistliche Schauspiel* (1858; trans., *Miracle Plays and Sacred Dramas*, 1880); *Handbuch der protestantischen Polemik gegen die römisch-katholische Kirche* (1862, 4th ed. 1886). He also published several works on ecclesiastical law; an edition of the *Libri Symbolici Ecclesiæ Evangelicæ* (1827); and *Ideale und Irrthümer* (1872).

HASE, hä'ze, KARL BENEDIKT (1780-1864). A German philologist, born at Sulza, near Weimar. He studied at Jena and Helmstedt, and in 1801 went to Paris, where he was put in charge of the manuscripts of the Imperial Library (1805), was appointed professor of Greek paleography and of modern Greek at the Ecole des Langues Orientales (1816), then professor of German at the Polytechnic Institute (1830), conservator of manuscripts in the library (1832), and, in 1852, professor of comparative grammar in the University of Paris. He was long an editor of the *Journal des Savants;* contributed to Dindorf's edition of Stephanus's *Lexicon* (1831-44); edited Leo Diaconus (1819); Valerius Maximus (1823); Suetonius (1828); and the fragment, *De Ostentis et Mensibus*, by Laurentius Lydus (1823); and by his wide knowledge of late Greek greatly facilitated the publication of *Recueil des historiens des croisades* (1875). Consult: Guigniaut, *Notice historique sur Hase* (Paris, 1867); and Haine, *Hases Briefe von der Wanderung und aus Paris* (Leipzig, 1894).

HASELRIG, hā'zel-rig, **HESILRIGE**, or **HAZLERIGG**, Sir ARTHUR (?-1661). An English statesman, member of the Long Parliament, and one of the famous Five impeached by King Charles. He took an active part in the Civil War as commander of a regiment of horse called 'The Lobsters' by the Royalists, and was equally prominent in Cromwell's Parliament, but opposed to the protectorate. Ultimately he voted for the restoration of the Stuarts, though too late in so doing to save more than his life, for he died in the Tower.

HASELTINE, ha'zel-tīn, WILLIAM STANLEY (1835—). An American painter, born in Philadelphia. He studied under Weber in his native city, and at Düsseldorf, and was elected a National Academician in 1861. Much of his life was spent in Italy, and he rarely exhibited. Among his works are views of Nahant, Capri, and Amalfi.

HASENAUER, hä'ze-nou'ēr, KARL, Baron von (1833-94). An Austrian architect, born in Vienna, where he studied at the academy under Van der Nüll and Siccardsburg, and obtained the first prize in 1854. After having traveled extensively in Germany, Italy, France, England, and Scotland, he entered upon an active career in Vienna, was again awarded the first prize for architecture at the art exhibition of 1864, became a member of the Academy of Fine Arts in 1866, and honorary member of the Institute of British Architects in 1868. Among a number of

private palaces built by him, the Palais Lützow is to be noticed as one of the finest houses in Vienna, but his most important work was the erection of the magnificent Imperial Museums of Art and Natural History (1872-91) in purest Renaissance style, after his own and Semper's designs. He also built the new Hofburg theatre (completed 1888), and designed the addition to the Imperial palace. He was architect for the buildings of the Vienna Exposition in 1873, and was raised to a baronetcy in the same year.

HASENCLEVER, hä'zen-klā'vēr, JOHANN PETER (1810-53). A German painter, born at Remscheid. He studied under Schadow, at the Düsseldorf Academy, and then spent some years in Munich and Italy. After 1842 he settled in Düsseldorf. His works are usually humorous genre subjects, such as "A Family Quarrel" (1837, New Pinakothek, Munich); "Tasting Wine," and "The Reading Room" (1843, both in National Gallery, Berlin); "Topers in the Wine-cellar" (1847, Ravené Gallery, Berlin). He also executed a series of scenes from Kortum's *Jobsiade*, including "The Examination" (1840, New Pinakothek, Munich); "The School" (1846, Ravené Gallery, Berlin); and "Jobs as Night Watchman" (1852, ib.). His "Gaming-Table" is his most important work of a serious nature. He was also successful in portraiture.

HASENCLEVER, WILHELM (1837-89). A German socialist agitator, born in Arnsberg, Westphalia. He received his education at the gymnasium of his native city, and then became a tanner. In 1862 he was chosen editor of the *Westfälische Volkszeitung*, in 1871 president of the Allgemeiner Deutscher Arbeiterverein, and in 1875 presiding officer of the newly organized Socialist-Labor Party of Germany. He was elected to the Reichstag several times, and controlled or edited various socialist newspapers.

HASENPFLUG, hä'zen-pflōōg, KARL (1802-58). A German architectural painter, born in Berlin, the son of a shoemaker. After a hard struggle in early life, he became the pupil of the decorative painter Karl Gropius, and a few years later was enabled by a royal stipend to study at the academy, but really owed his development mostly to his own efforts. Attracted by the mediæval architecture of Halberstadt, he made his home there in 1830, and, besides cathedrals, painted chiefly views of ruined castles and convents half buried in snow, which appealed to a large public by their great poetic charm. Especially noteworthy among his works are two views of Cologne Cathedral (1832-33); Erfurt Cathedral (1827); and three views of and in Halberstadt Cathedral (1828-36, the last four in National Gallery, Berlin); "Cloister in Winter" (1840, Kunsthalle, Hamburg); "Mediæval Castle Yard" (1842, Schwerin Gallery); and "Ruined Chapel" (Stettin Museum).

HÄSER, hä'zēr, HEINRICH (1811-85). A German medical author, born at Rome, the son of the musician, August Ferdinand Häser. He studied medicine at Jena; taught there from 1836 to 1849, then went to Greifswald, and in 1862 to Breslau. He edited: Gruner, *Scriptores de Sudore Anglico* (1847); a *Bibliotheca Epidemiographica* (2d ed. 1862); the *Repertorium für die gesamte Medizin* (1840-42); and the *Archiv für die gesamte Medizin* (1840-49); and wrote: *Historisch-pathologische Untersuchungen* (1839-41); *Lehrbuch der Geschichte der Medizin und der Volkskrankheiten* (3d ed. 1875-82); *Geschichte der christlichen Krankenpflege und Pflegerschaften* (1857); *Die Vaccination und ihre Gegner* (1854); and *Grundriss der Geschichte der Medizin* (1884).

HASHISH, hāsh'ēsh (Ar. *hashīshat*, from Ar. *hashīsh*, herbage, hay, from *hashsha*, to cut grass). The Oriental name of the tops and tender parts of Indian hemp (*Cannabis Indica*). Various preparations of the plant are employed for the producing of a peculiar intoxication. A favorite mode of extracting its active principle is by boiling the tops and flowers with water to which butter or oil has been added, evaporating, and thus forming an oleaginous solution or fatty extract. This fatty extract is frequently mixed with other substances which are reputed to possess aphrodisiac properties, and is taken in the form of electuary confection, or pastil. The majoon used at Calcutta, the mapouchari employed at Cairo, and the dawames or dawamesk of the Arabs, are preparations of this kind. In India it is employed as a narcotic stimulant under the names hashish, churrus bhang, and gunjah. American hemp (*Cannabis Americana*) possesses a similar but weaker action. The effect of hashish depends largely upon the individual. Among the Orientals the dreams are often of an erotic character, but this is not so among the Western nations. One of the first appreciable effects of the drug is the gradual weakening of the power of controlling and directing of the thoughts. Then comes the stage already described; and accompanying, and in part following it, there are observed errors of sense, false convictions, and the predominance of one or more extravagant ideas. These ideas and convictions are generally not altogether of an imaginary character, but are suggested by external impressions which are erroneously interpreted by the perceptive faculties. A minute may seem a year, and an hour only an instant. Sounds may be greatly exaggerated. The sense of duration of time and extent of space and the appreciation of personality are lost; there is a sensation of weight in the extremities, and anæsthesia of the skin, which may often become complete. Finally, if the dose is sufficiently powerful, there is marked drowsiness and sleep. The drug is used as a sedative as a substitute for opium. For the relief of pain in neuralgia and migraine it has been successfully used.

HAS'IDÆ'ANS. A Jewish sect. See CHASIDIM.

HAS'KELL. A town and the county-seat of Haskell County, Tex., 16 miles north of Stamford, the nearest railroad station (Map: Texas, E 3). The leading industries are farming and stock-raising. Population, about 1000.

HAS'KINS, CHARLES HOMER (1870—). An American historical scholar, born at Meadville, Pa. He graduated at the Johns Hopkins University in 1887, where he remained as an instructor in history until 1890, when he took his Ph.D. degree, and accepted a position as instructor at the University of Wisconsin. In 1891 he became assistant professor of history, and in 1892 was elected professor of institutional history, which chair he retained until 1902. He spent the year 1896-97 in research work in Europe, devoting himself

especially to examination of the Vatican archives at Rome. In 1899-1900 he was a lecturer on history at Harvard University, and in 1902 was made professor of history in that institution.

HASLER, häs'lēr, or **HASSLER**, HANS LEO VON (1564-1612). A German composer, one of the founders of a national German music, born at Nuremberg. He studied with his father, Isaac Hasler, town musician, and in 1584 with G. Gabrieli at Venice. He was the first important German composer who studied in Italy, and his works, despite their originality, were influenced by the Italian style. From 1585 to 1601 he was organist to Count Octavianus Fugger at Augsburg; in the latter year he received the post of Court musician at Prague to Emperor Rudolph II. In 1608 he accepted an appointment at the Court of the Elector of Saxony. His compositions were of great value in the history of music, but are of little modern importance. Consult Eitner, *Chronologisches Verzeichniss* (Berlin, 1873-74) of Hasler's printed works.

HASLINGDEN, hāz'lĭng-dĕn. A manufacturing and market town in Lancashire, England, four miles south-southeast of Accrington (Map: England, D 3). It has manufactures of cottons, silks, woolens, sizing of cotton warps, and ironworks. In the neighborhood are coal-mines and extensive stone-quarries. Situated in a hilly district near the Forest of Rossendale, it derives its name, signifying 'Hollow of the Hazels,' from the neighboring trees. Its church, restored in 1879, dates from the thirteenth century, and has handsome endowed schools attached. Population, in 1891, 18,200; in 1901, 18,500.

HAS'MONÆ'ANS. See MACCABEES.

HASNER, häz'nēr, LEOPOLD, von Artha (1818-91). An Austrian statesman and jurist, born at Prague. He studied law at Prague; was appointed professor of the philosophy of law there (1849), and then of political economy (1851); and was elected to the Bohemian Diet and the Austrian House of Deputies in 1861. Two years afterwards he was made president of the latter body and head of the Council of Education. In 1865 he became professor of political economy in the University of Vienna, was called to the Austrian House of Peers in 1867, was appointed Minister of Public Instruction in 1868, and was for a short time president of the Ministry in 1870. He resigned in that year, and was active as a leader of the Liberal Centrist Party in the Upper House. The Austrian public-school system in its present form is a product of his labors. He wrote: *Filosofie des Rechts und seiner Geschichte in Grundlinien* (1851), and an unfinished *System der politischen Oekonomie* (1861). Consult his posthumously published *Denkwürdigkeiten, Autobiographisches und Aphorismen* (Stuttgart, 1892).

HASPINGER, häs'pĭng-ēr, JOACHIM (1776-1858). A Tyrolese patriot, born at Sankt Martin im Gsiess. He studied at Bozen and Innsbruck, fought against the French in 1796, 1797, and 1799-1801, and became a Capuchin priest in 1805. He was an ardent patriot, and took a leading part in the rising of the Tyrolese against Bavaria, to which power Napoleon had given their country. In 1809 he distinguished himself by his bravery in a number of encounters with the French, and in 1810 he was second only to Hofer and Speckbacher as a leader in the renewed revolt of that year. In 1810 he was exiled by the Bavarians and went to Vienna, whence he was sent on a secret mission two years afterwards to arouse the people of Upper Italy to revolt. He was pastor of a church near Vienna, at Hietzing, from 1814 to 1848; then went into Italy as chaplain to a company of Tyrolese volunteers; lived at Döbling until 1854, and then at Salzburg. He was buried beside Andreas Hofer at Innsbruck. As a member of the Capuchin Order he had unusually great influence with the people, who called him 'Pater Jochem' and 'Rotbart.' Consult Schallhammer, *Biographie des Tiroler Heldenpriesters Joachim Haspinger* (Salzburg, 1856).

HAS'SALL, ARTHUR (1853—). An English historian, born at Bebington, in Cheshire. He studied at Trinity College, Oxford, where he was history exhibitioner in 1876, and the next year won a first-class honor in the School of Modern History, Oxford. From 1880 to 1883 he was a lecturer and tutor at Keble College, and from 1890 to 1892, and again in 1901, examiner in the Honor School of Modern History. He was elected a member of the Hebdomadal Council from 1892 to 1896; was senior proctor in 1893-94; Censor of Christ Church, 1894-95; and was reëlected member of the Hebdomadal Council in 1897. His publications include: *Louis XIV. and the Zenith of the French Monarchy* (1895, in the "Heroes of the Nations" Series); *The Balance of Power, 1715-89* (1896, in the series "Periods of European History," of which he was made general editor); *History of France* (1901); and *The French People* (1901).

HAS'SAM, CHILDE (1859—). An American painter, born in Boston. He studied in Paris under Boulanger and Lefebvre, and has won many medals and prizes. He was elected president of the New York Water-Color Club, and was made one of the Ten American Artists, and a member of the Société Nationale des Beaux-Arts in Paris. His street scenes are notable for atmospheric effect, and his landscapes, in the impressionistic French style, are brilliant in color and broadly painted. His "Plaza Centrale, Havana," won the Webb prize in 1895. He received a third-class medal at the Paris Exposition of 1889.

HASSAN BEN SABBAH, häs'sân ben säb'-bä. The founder of the sect of the Assassins (q.v.).

HAS'SAR. Any of several of the dorads or mailed catfish of the Orinoco River and its tributaries, which have some extraordinary habits. They make nocturnal journeys in the dry season, from a diminishing pond to another one, or from river to river, overland, often in companies, and to such distances that several nights are consumed in travel. They also construct nests of leaves at the margin of ponds and streams at the beginning of the rainy season, where the eggs are deposited and guarded till they hatch. Most of them belong to the genus Doras.

HAS'SARD, JOHN ROSE GREENE (1836-88). An American journalist. He was born in New York City, and graduated at Saint John's College, Fordham, in 1855. He was one of the editors of the *New American Cyclopædia*, in 1865

edited the *Catholic World*, and in 1866 joined the editorial staff of the New York *Tribune*. He became widely known as a graphic correspondent, and also as a musical critic of rare capacity and judgment. After the death of George Ripley (1880), he was also literary editor of the *Tribune*. In 1878, with Grosvenor, also of the *Tribune*, he deciphered the telegrams which were thought to prove corruption on the part of the Democratic National Committee, or of Tilden's friends, in the disputed election of 1876. Among his publications are: *a Life of Archbishop Hughes* (1866); *The Ring of the Nibelung* (1877); *Life of Pius IX.* (1878); and *A Pickwickian Pilgrimage* (1881).

HASSE, häs'se. FRIEDRICH RUDOLF (1808-62). A German Protestant Church historian. He was born in Dresden, June 29, 1808, educated at Leipzig and Berlin, and at the latter university first took up the study of Anselm of Canterbury. In 1834 he began to lecture in Berlin on Church history, and went to Greifswald as extraordinary professor of Church history in 1836; thence in 1841 in the same capacity to Bonn, where he became full professor (1849). He made his reputation by his masterly work on Anselm—vol. i., *Life* (1843); vol. ii., *Theology* (1852). He died at Bonn, October 14, 1862. After his death his lecture outlines upon the *Geschichte des alten Bundes* (1863), and *Kirchengeschichte* (1864; ed. by W. Engelmann, 1872), appeared. For his life, consult Krafft (Bonn, 1865).

HASSE, JOHANN ADOLPH (1699-1783). A German dramatic composer, born at Bergedorf, near Hamburg. In 1718 he became a tenor at the Hamburg Opera, and in 1722 became connected with the Brunswick Theatre, where the next year his first opera, *Antigonus*, was produced. In 1724 he went to Italy, studying with Porpora and A. Scarlatti. In 1731 Augustus the Strong appointed him kapellmeister and director of the opera at Dresden, and his wife, the celebrated singer, Faustina Bordini, was engaged as prima donna. While in that city he was involved in a bitter rivalry with Porpora and Mingotti, and it was not until after their departure that Hasse became supreme. At the siege of Dresden, in 1760, he suffered great losses, many of his manuscripts being destroyed. His operas, some of the best of which were composed during his stay in Italy, were extremely popular, among the best of them being: *Il Sesostrate* (1726); *Attalo, re di Bitinia* (1728); and *Dalisa* (1730). In his seventy-fifth year he produced at Milan his last opera, *Ruggiero*, in celebration of the marriage of the Archduke Ferdinand. His music was marked by great naturalness of expression and charming melody. In addition to over a hundred operas, he wrote ten oratorios, five Te Deums, and numerous instrumental pieces and sacred compositions.

HASSELQUIST, häs'sel-kwĭst, FREDRIK (1722-52). A Swedish naturalist, born at Törnevalla, East Gothland, and educated at Upsala. In 1749 he undertook a journey to Palestine. He spent the winter in Smyrna, and the next year in Cairo, where he studied the ebb and flow of the Nile, and later proceeded to the Holy Land. He died near Smyrna, on his return. Linnæus published his *Iter Palæstinum* (1757; translated into English, 1766).

HASSELT, häs'sĕlt. The capital of the Belgian Province of Limburg, situated on the left bank of the Demer, 49½ miles by rail from Antwerp, and 19 miles from the Netherlands frontier (Map: Belgium, D 4). It has manufactures of tobacco, laces, linen, and chicory. The town possesses a theological and a teachers' seminary and an industrial school. Population, in 1890, 13,250; in 1900, 15,249. Here the Dutch gained a victory over the Belgians on August 6, 1831.

HASSELT, à'sâl', ANDRÉ HENRI CONSTANT VAN (1806-74). A Belgian historian and poet, born at Maestricht, and educated at Liège and Ghent. He was employed in the Royal Library at Brussels; was appointed inspector of primary education (1843) and of normal schools (1850); and edited the old French *Romans de Cléomadès* (1865). He compiled: *Het gouden Boeksken* (1845); *Cours de littérature française* (1861); and *Leçons choisies de littérature française* (1865). His prose works include: *Histoire de Rubens* (1840); *Les Belges aux Croisades* (1846); and *Histoire des Belges* (1848); and among his poems mention should be made of: *Poésies* (1852-57); *Primevères* (1854); *Poèmes, paraboles, odes et études rhythmiques* (1862); *Les quatre incarnations du Christ* (2d ed. 1872); and *Le livre des ballades* (1872). He also wrote juveniles under the pseudonym 'Alfred d'Aveline' or 'Charles André,' and some Flemish poetry under the name 'Jan van Limburg.'

HASSENFRATZ, à'säN'frâts', JEAN HENRI (1755-1827). A French scientist, born in Paris. He studied under Monge, became a geographical engineer (1780), and after three years' study of mining, entered Lavoisier's laboratory. He was an ardent Jacobin, a member of the Assembly which decided the fate of the Girondists, and was instrumental in postponing the decree against them. Throughout the Revolution he was active in providing military material, in reorganizing military schools, and in founding the Ecole Centrale de Travaux Publics, in which he was professor of mineralogy and physical geography, and which later became the Polytechnic School. In 1795 he led the bands of the Faubourg Saint-Marceau in their attack on the Convention, and had to leave Paris until the general amnesty of that year. In 1797 he became professor of physics at the School of Mines, and taught until 1814, when he retired. Besides contributions to the *Annales de Chimie* and the *Journal des Mines*, he wrote: *Manuel militaire* (1790); *Géographie élémentaire* (5th ed. 1809); *Cours révolutionnaire d'administration militaire* (1794); *Tableau de minéralogie* (1796); *Cours de physique céleste* (1803); *Sidérotechnie* (1804).

HASSENPFLUG, häs'en-pflōōg, HANS DANIEL LUDWIG FRIEDRICH (1794-1862). A Hessian Minister, born at Hanau, and educated at Göttingen. He was made Minister of Justice and of the Interior (1832), and was an energetic administrator, but a bitter enemy of the Hessian Constitutional Party in the Diet, and of a free press. For five years his absolutist policy was successful, but in 1837 he found himself losing favor at Court, and left the country. In 1841 he went to Berlin, where he was a member of the judiciary until 1850, when he returned to Cassel as Prime Minister, and again fought and finally lost the battle with the Diet. In 1855 Hassen-

pflug retired to Marburg, where he died seven years afterwards.

HASSENSTEIN, häs'en-stīn, BRUNO (1839-1902). A German cartographer, born at Ruhla. His work includes revisions of Fay's *Great Outline of Geography* (1869), and Spruner's *Handatlas* (1871-79); a new atlas of Japan (1885); and in *Petermanns Mitteilungen*, maps of most of the important exploring expeditions since 1878, especially of the country covered by Junker, Emin Pasha, Hans Meyer, and Sven Hedin.

HASSLER, häs'lēr, FERDINAND RUDOLPH (1770-1843). A Swiss-American engineer; born in Aarau, Switzerland. He was employed for a time on the trigonometrical survey of Switzerland, subsequently emigrated to the United States, and was acting professor of mathematics at West Point from 1807 to 1810, and at Union College in 1810-11. He was the first superintendent of the United States Coast Survey, and for many years was chief director of that important work. He was afterwards at the head of the Bureau of Weights and Measures in the Treasury Department. His publications include a *System of the Universe*, and valuable reports to Congress on weights and measures, besides several textbooks of science.

HASSLER EXPEDITION. The name given to the United States Coast Survey expedition of 1871, in the steamer *Hassler* (see HASSLER, F. R.), which was the first important scientific expedition sent by the Government for marine exploration. The expedition included Prof. Louis Agassiz and Mrs. Agassiz; Dr. F. Steindacher, ichthyologist; Dr. Thomas Hill, botanist; and Count L. F. de Pourtales, Mr. J. A. Allen, and others. The steamer left Boston December 4, 1871, and reached San Francisco in August, 1872. On the way to Saint Thomas surface observations were made. Deep-sea dredging was done at Barbadoes and along the Brazilian coast. At the Straits of Magellan frequent stops were made, and at particularly interesting places several days were spent, and inland excursions were made, especially to examine glaciers. Throughout the route collections were made, and much of this material was deposited in the Museum of Comparative Zoölogy at Cambridge, Mass. Some of the zoölogical results of the expedition have been published by Agassiz, Lyman, and Pourtales.

HASSUNITES, häs'sun-īts. A name given to the followers of Anton Hassun (1809-84), an Armenian patriarch. Hassun desired to acknowledge the supremacy of the Pope and attended the Vatican Council of 1870. A considerable number of the Armenians were opposed to Hassun, and chose the Bishop Kupelian in his place. After much strife Hassun was banished by the Sultan. Kupelian acknowledged the Pope in 1879, and Hassun, who had been allowed to return to Constantinople, was acknowledged by the Government as head of the Armenian Catholics in Turkey. The anti-Hassunites also submitted to the Pope. In 1880 Hassun resigned, went to Rome, and was made a cardinal.

HASTINAPURA, häs'tī-nä'pōō-rä (Skt., Elephant City). An ancient city of India, on the bank of the Ganges, some fifty miles northeast of the present city of Delhi, and probably one of the earliest Aryan settlements outside of the Punjab. Its importance lies in the fact that it forms a central point of the principal scenes of the *Mahābhārata*. It was the residence and capital of the Kuru family; whereas their rival and noble cousins, the Pandus, built their royal city at Indraprastha, or Indrapat, nearly on the site of the modern Delhi. There are but few traces of the ancient city Hastinapura remaining, though tradition points to a group of shapeless mounds as being the residence of the princes of the House of Bharata whose deeds are commemorated in the great national epic.

HASTINGS, häst'ĭngz. A Parliamentary and county borough in Sussex, England, on the English Channel, 62 miles southeast of London (Map: England, G 6). It was the premier Cinque Port, but lost its importance after being burned by the French in 1377. It is now the largest fishing-station on the south coast, and a celebrated watering-place, largely frequented for its historical interest, picturesque situation, fine sandy beaches, and its healthful, bracing climate. It lies in a valley, surrounded by hills. Saint-Leonard's-on-Sea, a western suburban town, has been absorbed and joined to the borough. Hastings has two fine piers, large tepid swimming-baths, numerous hotels, good schools, and interesting remains of an ancient Norman castle. The marine parade, three miles in length, is one of the finest sea walks and drives in the kingdom. The town owns spacious open grounds on the East and West hills, a beautiful park, three public gardens, the Brassey Institute, with public library, museum, and art schools presented by Lord Brassey, a fish market, cemetery, an excellent well-water supply, and electric-lighting supply, and maintains bath-houses and hospitals. The streets are sprinkled with sea-water, which is also supplied to private houses for bath purposes through mains. In 924 Athelstan established a mint at Hastings, then an important place, and there William the Conqueror landed and encamped prior to his famous victory over Harold at Senlac Hill (now Battle Hill), which secured to him the conquest of England, on October 14, 1066. On the spot where Harold fell William founded Battle Abbey. (See BATTLE MONUMENT.) William I. by charter made Hastings one of the Cinque Ports. Hastings had early municipal privileges, and received its charter of incorporation from Elizabeth. Population, in 1891, 63,000; in 1901, 65,000. Consult: Cooper, *Notices of Hastings* (1862); Burrows, *Cinque Ports* (London, 1888).

HASTINGS. A city and the county-seat of Barry County, Mich., 32 miles southeast of Grand Rapids; on the Thornapple River, and on the Michigan Central and the Chicago, Kalamazoo and Saginaw railroads (Map: Michigan, H 6). It has a public-school library, and a fine city hall, court-house, and jail. The city is of importance as a manufacturing centre, its products comprising flour, furniture, felt boots, cigars, hose-reels, pumps, car-seats, carriages and wagons, etc. The water-works are owned by the municipality. Population, in 1890, 2972; in 1900, 3172.

HASTINGS. A city and the county-seat of Dakota County, Minn., 20 miles southeast of Saint Paul, at the junction of the Vermillion River with the Mississippi, and on the Chicago,

Milwaukee and Saint Paul Railroad (Map: Minnesota, F 6). It is of considerable importance as a distributing centre, and exports grain, flour, and lumber; its industries include several grain-elevators, a malt-house and breweries, saw, planing, and flour mills, sash, door, blind, wagon, and furniture factories, etc. Population, in 1890, 3705; in 1900, 3811.

HASTINGS. A city and the county-seat of Adams County, Neb., 96 miles west of Lincoln, on the Chicago, Burlington and Quincy, the Missouri Pacific, and other railroads (Map: Nebraska, F 3). It is the seat of Hastings College (Presbyterian), opened in 1882, and of the State Asylum for the Chronic Insane, and has a fine city hall, and City, Prospect, and Heartwell parks. The city is surrounded by an agricultural and stock-raising section, has an important trade in grain, and manufactures flour, wagons, etc. Hastings, incorporated in 1874, is now governed under a charter of 1901, which provides for a mayor, elected biennially, and a city council, the members of which are elected one-half by wards and one-half at large. The water-works and electric-light plant are owned and operated by the municipality. Population, in 1890, 13,584; in 1900, 7188.

HASTINGS. A Danish viking, or sea rover, of the ninth century, to whom legend ascribes most of the deeds performed by the Danish pirates of that time. The facts known concerning him are as follows: From 859 to 863 he was engaged in plundering the Spanish and Italian coasts, and in the latter country captured Luna by stratagem. In 866, Robert, Count of Paris, fell in battle fighting against Hastings, who was then in the Loire Valley. He left this portion of France in 872, and in 889 appeared in the valley of the Somme. In 893 he was defeated by Alfred the Great with whom he made peace. At that time the two sons of Hastings were baptized. Of his later history nothing is known.

HASTINGS, Battle of. The name usually given to the great struggle which took place at Senlac, near Hastings, on October 14, 1066, between the Normans, under William, Duke of Normandy, and the English, under King Harold. Duke William claimed that Harold had agreed to support his claim to the English crown on the death of Edward the Confessor (q.v.), and when this was not done William began preparations to wrest the crown from Harold by force. Harold had just conquered his brother and rival, Tostig, at Stamford Bridge (September 25, 1066), when he heard that the Normans were ravaging the south, and he immediately hastened in that direction. He reached the hill of Senlac on October 13th, and proceeded to fortify his position with a palisade and a ditch. The Norman army was divided into three parts, of which the left wing consisted of Bretons, Poitevins, etc, the right wing of mercenary troops, and the centre of Norman knights and archers led by Duke William in person, and grouped around the banner which the Pope had given. On the English side the best troops were the Hus-carls or bodyguard of Harold. At nine in the morning the battle began with a shower of arrows from the Norman archers, but no impression was made on the English ranks. The Bretons fled and a part of the English, contrary to Harold's orders, broke ranks and pursued. William noticed that they became disordered thereby, and he ordered a large part of his army to feign a retreat. The English fell into the trap, broke their ranks and began to pursue. The Norman centre thereupon was able to storm the summit of the hill, and though the English still fought bravely, Harold's eye was pierced by an arrow, and the battle was lost. William met little vigorous opposition henceforth in his conquest of England. Consult: Freeman, *Norman Conquest*, vol. iii. (2d ed., London, 1876); Green, *The Conquest of England*, vol. ii. (London, 1899). On the spot where Harold stood William erected Battle Abbey. See Battle Monument.

HASTINGS, Francis Rawdon-Hastings, first Marquis of (1754-1826). An English soldier and statesman, Governor-General of India. He was educated at Harrow, and matriculated at Oxford, but entered the army at the age of nineteen, and was sent to America, where he distinguished himself in the Revolutionary War till 1781, rising to be adjutant-general (1778), and afterwards brigadier. He was rewarded with a title, Baron Rawdon, and in ten years had inherited another title from his father, the Earl of Moira. His campaigning in Holland (1794-95) was followed by a term of home service, as master-general of ordnance, and he also was most active in the politics of the time. He was Governor-General of India from 1813 to the beginning of 1823. There he showed his mettle in the transformation of the warlike Gurkhas from foes into friends, and he was accused even of exceeding his instructions in the subjugation of native races, to whom, however, he played the amiable despot, encouraging education and civil reform. In recognition of his services in the establishment of British power in India, he was made Marquis of Hastings (1816), and he was commander-in-chief at Malta for the last two years of his life.

HASTINGS, Frank Abney (1794-1828). An English naval commander. He was the son of Lieut.-Gen. Sir Charles Hastings, and was forced to leave the British Navy for insubordination. He joined the Greek Navy in the struggle against the Turks, fought at Nauplia (1822), and served in Crete as commander of artillery. He bought and equipped a vessel in 1824, with which he did great damage to the Turkish fleet, distinguishing himself especially in the bay of Salona in 1827. In December of the same year Hastings captured Vasiladi. He died of a wound received at Anatolikon in 1828.

HASTINGS, Henry, Earl of Huntingdon. See Huntingdon.

HASTINGS, Selina Shirley. See Huntingdon, Selina Hastings.

HASTINGS, Thomas (1787-1872). An American musician. He was born at Washington, Conn., but at an early age removed to Clinton, N. Y. He became interested in sacred music, and made its study and improvement the chief business of his life. From 1823 to 1832 he edited a religious paper, the *Recorder*, in Utica; then went to New York City as musical instructor and composer, and there published, among other works: *Mother's Hymn Book* (1849); *History of Forty Choirs* (1854); and *Dissertation on Musical Taste* (2d ed. 1853).

HASTINGS, Warren (1732-1818). An English statesman, Governor-General of India. De-

scended from an ancient family long settled at Daylesford, in Worcestershire, he was born at Churchill, in Oxfordshire, on December 6, 1732. He was early left an orphan; but when only seven years old he resolved to recover the estate which had passed out of the possession of his family. Entering Westminster School, he became an excellent scholar, when, at seventeen, he was sent to India as a service writer in the East India Company's service. Having realized but a moderate fortune, notwithstanding the great temptation to enrich himself by means of his position, he returned in 1764 to England. In 1769 he again went to India, on his appointment as member of the Council at Madras, and in 1772 he became president of the Supreme Council of Bengal. When a little later Parliament created a Governor-Generalship of India, it bestowed that office upon Hastings, who entered upon his duties at the beginning of 1774. The finances of his Government were in a disordered state, and the incessant demands of the East India Company for money led to some unscrupulous expedients for raising funds. For instance, Siraj-ud-Daula, Nawab of Oudh, having a claim upon the rich provinces of Katahr, occupied by the Rohillas, asked of Hastings military aid in subduing these people. Hastings granted the request, as in fact a treaty with the Nawab required, and received for the service a large sum of money, which he used to supply a deficit in the Bengal treasury. The Nawab treated the conquered with great severity in spite of the intercession of Hastings. The condemnation and execution of the ambitious, intriguing Brahman, Nanda Kumar, is perhaps unjustly laid at his door. But to raise more money Hastings deposed Chait Singh, Rajah of Benares, for disloyalty and insurrection, and confiscated his possessions. He made an agreement also with Asaph-ud-Daula, son of Siraj-ud-Daula, under which he deprived the mother and grandmother of the Nawab of extensive domains which had fallen irregularly into their hands. The administration of Warren Hastings, although he was constantly trammeled by orders from home, and frequently borne down by an able and factious majority in his own council, was vigorous and successful, and his conduct of military affairs was no less efficient. He broke the power of Hyder Ali, Rajah of Mysore; he organized a system by which justice was dispensed, the revenue collected, and peace maintained. It is greatly to his credit, too, that he encouraged Asiatic learning. When he left India in the spring of 1785 that great empire was tranquil. A treaty had been concluded with Tipu Sahib, son and successor of Hyder; and the Carnatic had been evacuated by the armies of Mysore. On his arrival in England he was received with distinction by George III. and the Court. The directors acknowledged his services by a unanimous vote of thanks. The Whig opposition was, however, loud and vehement against him, and succeeded in carrying in the Lower House a motion for his impeachment at the bar of the House of Lords. The trial began in Westminster Hall, February 12, 1788, the managers of the impeachment being Burke, Fox, Sheridan, Windham, and Charles (afterwards Earl) Grey. Burke opened the proceedings in a speech which extended over four sittings; Fox and Grey urged the charge respecting Chait Singh; and Sheridan was intrusted with the conduct of the article relating to the begums or princesses of Oudh. The interest taken by the public in the impeachment began to decline after these great displays of rhetoric. The trial, notwithstanding, lasted for upward of seven years. On April 23, 1795, it terminated in the acquittal of Hastings. Of 400 peers only 29 voted.

Hastings passed the last twenty-four years of his life at Daylesford in the pursuits of literature and in the occupations of a country gentleman. He died on August 22, 1818, in his eighty-sixth year, and was buried behind the chancel of the parish church of Daylesford. A man of great industry, with an extraordinary capacity for administrative details, he undoubtedly labored for the good of India, often, however, by questionable methods. To him the English Government is largely indebted for its political and judicial organization of India, and for its method of Indian administration. Consult: Gleig, *Memoirs of the Life of Warren Hastings* (3 vols., London, 1841), containing original documents; Trotter, *Warren Hastings* (London, 1878); Bond, *Speeches of the Managers and Counsel* (London, 1859-61); Mill, *History of British India* (London, 1848); *The Minutes of Evidence* (London, 1786); *History of the Trial* (London, 1796); *Debates of the House of Lords* (London, 1797); Forrest, *Administration of Warren Hastings, 1772-1785* (Calcutta, 1892); Lawson, *Private Life of Warren Hastings* (London, 1895); Logan, *Review of the Principal Charges Against Warren Hastings* (London, 1878); Lyall, *Warren Hastings* (London, 1889); Macaulay, *Essay on Warren Hastings* (biased); Malleson, *Life of Warren Hastings* (London, 1894); Strachey, *Hastings and the Rohilla War* (Oxford, 1892); Busteed, *Echoes from Old Calcutta* (2d ed., Calcutta, 1888); Beveridge, *Trial of Nanda Kumar* (Calcutta, 1886); Stephen, *Dictionary of National Biography*, xxv. (brief but excellent biography by Keene).

HASTINGS, Lord WILLIAM (c.1430-83). An English soldier in the service of King Edward IV. He was the son of Sir Leopold Hastings, and upon his father's death succeeded to landed estates in Warwickshire and Leicestershire. Upon the accession of Edward IV. to the throne in 1461, he rewarded Hastings, who, during the civil war, had been a faithful friend and retainer of his father, the Duke of York, with lucrative offices and grants of land. He was an energetic soldier in all the King's wars, besides being an ambassador and negotiator for him on various occasions. He fought in Edward's Scottish campaigns, and upon Warwick's invasion, aided the King in escaping, raised forces in his behalf, and, after his return, commanded part of the army at the battle of Barnet. Having invaded France in 1475, he obtained a treaty of peace and an annuity from the French King. After the death of Edward IV. he was accused of treason by the Duke of Gloucester, and beheaded.

HASTINGS SAND. See WEALDEN FORMATION.

HASTY PUDDING. A humorous poem, by Joel Barlow, published in 1796 at New Haven with a dedication to Martha Washington.

HAS'WELL, CHARLES HAYNES (1809—). An American civil, marine, and mechanical engineer, born in New York City. He learned his profession in a steam-engine factory, and in 1836 was appointed chief engineer in the United States

Navy. During his service, which lasted until 1850, he was a member of the boards which designed the *Missouri*, the *Mississippi*, and six other steam frigates. He built the first practicable steam launch (1837), and was the first to use zinc to protect the hulls of iron vessels and marine steam boilers from the galvanic action of salt water and copper. He superintended the construction of the crib bulkhead at Hart's Island, and after 1898 was the consulting engineer of the board of public improvements in New York City. His publications include: *The Mechanic's and Engineer's Pocket Book* (1844; 66th ed. 1901); *Mechanic's Tables* (1854); *Mensuration and Practical Geometry* (1856); and *Reminiscences of an Octogenarian* (1895).

HAT (AS. *hæt*, Icel. *hattr;* connected ultimately with Skt. *chad*, to cover), and HAT MANUFACTURE. The hat is a head-covering, distinguished from the cap and bonnet by having a brim around it. Hats were first manufactured in England about 1510, and superseded caps, or soft headgear, in the reign of Queen Elizabeth. The felting of caps is, however, said to have been known long before this period; and there is a tradition that a knowledge of felted caps or hats had been introduced by the Crusaders. At any rate such an industry flourished in Germany and France in the fourteenth and fifteenth centuries. As the process of felting is ascribed by tradition to Saint Clement, he was early assumed as the patron saint of the craft, and the annual festival of the trade was appointed for the 23d of November. Wool was the material first employed in forming felt hats; but in time, as European trade with America developed, the fur of the beaver, being finer and softer, came into use; hence the term beaver was long synonymous with hat. For about three centuries, fine beaver hats dyed black, and prepared with much skill, formed the head-covering of the higher classes in Great Britain, and distinguished them from the middle and humbler classes, which continued for a length of time to wear the less expensive caps and bonnets.

The growing scarcity of beaver-fur led to attempts to substitute a cloth formed of silk plush, drawn over a pasteboard frame, about 1810. These were not very successful; and hats of wool or beaver-felt were common until about 1840. The high cost of beaver at length brought out the improvement of silk hats to such an extent that the beaver was entirely superseded, and the fabrication of silk hats brought to great perfection.

With the course of fashion hats have undergone a great variety of changes of shape. The raising of the top part and the widening or diminishing of the brims have constituted the chief differences. Sometimes the top has been high and narrow, sometimes high and widened; and as regards the brim it has sometimes been so broad as to loop up. Political and religious differences have been marked by the form of hats. The Puritan of the reign of Charles I. adopted the steeple hat, high and narrow, with a broad brim, and devoid of ornament. The Cavalier, during the same era, wore a lower and broader crown, with a feather stuck on one side. The Quaker hat, low in the crown, with a broad brim, and plain, dates from the origin of the sect at the middle of the seventeenth century. A growing extravagance in breadth of brim led to the device of looping up the back and sides, and thus led to the cocked hat which was worn by gentlemen throughout the eighteenth century. Some men of fashion, however, by way of singularity, wore low-crowned hats with brims, from which was evolved the round hat, which finally superseded every variety of cocked hat at the beginning of the nineteenth century.

The Hungarian patriot Kossuth introduced into the United States the soft felt hat, which has since been an especial favorite in the South and West. Straw hats began to be worn in America about 1800, the first importations being of the palm-leaf variety. With the increased taste for traveling, and for bicycling, golf, and other out-of-door sports, a great demand has arisen from adults of both sexes and from children for light, soft, undressed hats, not easily damaged by rain or rough treatment. Such hats are usually of cloth, and come in great variety of shapes and colors.

HAT-MAKING IN THE UNITED STATES. The history of hat manufacture in this country dates back to very early colonial days. In 1662 the Assembly of Virginia enacted a law offering ten pounds of tobacco for every good wool or fur hat made in the Colony. In 1675 laws were passed prohibiting the exportation of raccoon furs from the provinces. By 1731 the industry had become of so much importance as to interfere most seriously with the trade of the English manufacturers, who in that year petitioned Parliament to forbid the importation of hats from the American colonies. A special committee to which the petition was referred reported that in New York and New England 10,000 beaver hats were manufactured annually, and that there were ten hatters in the single city of Boston, one of whom made forty hats a week. In accordance with the spirit of this petition, laws were passed forbidding the exportation of American hats to other English colonies, forbidding the manufacture of hats by any person who had not served an apprenticeship of seven years at the business, and forbidding negroes from working at the business. But in spite of these hampering restrictions, the industry continued to thrive and to be encouraged by the various colonial governments. Delaware, in 1753, offered a prize of forty shillings for the neatest and best hat manufactured in the lower counties. Carolina, by 1767, had developed a flourishing hat industry, with a large export trade to the Spanish islands. Soon after the close of the Revolution the manufacture of hats had become of great importance in Pennsylvania, and from that time the industry has continued to flourish. Statistics, showing the growth of this industry in the United States, are given at the close of this article.

MANUFACTURE. Felt hats are made in a wide range of qualities. The finer and more expensive qualities are formed entirely of fur; the commoner qualities use a mixture of fur and Saxony wool; and for the lowest kinds wool alone is employed. The processes and apparatus necessary for making hats of fur differ also from those required in the case of woolen bodies; and in large manufactories, especially in America, machinery is generally employed for operations which formerly were entirely manual. Hatter's fur consists principally of the hair of rabbits (technically called coneys) and hares, with some proportion of nutria, musquash, and beaver's

hair, though the latter material has been for many years extremely scarce, and generally any parings or cuttings from furriers are also used. Furs intended for felting are deprived of their long, coarse hairs, after which they are treated with a solution of nitrate of mercury, an operation called carroting or secretage, whereby the felting properties of the fur are greatly increased. The fur is then cut from the skin. Perhaps the modern method of making a felt hat may be best understood by describing the method of the ancient hatter and then the various modifications in this process which have been effected by machinery. Fifty years ago the hatter beat his fur with a bow into a triangular piece of felt which, when laid together by two straight edges, assumed the shape of a cone. (See FELT.) The felt was next shrunk between cloths which were kept hot and wet by frequent dipping in a kettle of boiling size, care being taken to preserve the triangular shape of the felt. Having been shrunk to about one-third its original size, or to proper dimensions for a hat, the conical bag was drawn over a block and tied tightly at the point where the crown spreads out into a brim. The brim portion was next pulled and stretched into shape with a special instrument. While still on the block, the hat was dyed, and again washed, stiffened, and dried. If a long nap was desired, the surface of the felt was carded; while to obtain a smooth finish it was rubbed with pumice-stone. It was then ready to be 'trimmed,' that is, to have the band, binding, lining, and sweat-band put on. Beginning with the cutting of the fur, these processes are now performed by automatic machinery. The description of the general method employed is condensed from that furnished by the Twelfth United States Census (section on wool manufactures), that being the most recent information available. The separation of the fur from the skin is effected by cutting the skin into shreds by means of rapidly revolving shear-blades, fixed just below a table, but so adjusted that, as the skin passes under a roller or guide fixed above the shear-blade, it drops beneath the machine, while the fur, without the apparent displacement of a fibre, passes on the other side of the roller, whence it is removed and packed away until required. Different kinds or qualities of fur are next mixed to produce the quality of hat desired—an operation which is accomplished by means of a machine called a 'devil,' in which the fibres are pulled apart and thoroughly mingled. The fur is next taken to a blowing-machine, where it is kept constantly agitated in a light current of air. The matted pieces, and those to which skin adheres, together with the hair and dirt thrown out from the fine fur, drop through a set of sieves which separate the valuable pieces of fur for further treatment. The blowing process continues until the fur is perfectly free from extraneous matter, when it leaves the machine in a lap, fine and soft, but so light and filmy that it hardly bears the touch. As the fur comes from the blower, it is weighed out into boxes, each of which contains fur enough for one hat. Each box of fur is now passed on to a 'former,' a machine which consists of a revolving cone made of brass or copper, of suitable size for the hat-body. The cone is pierced with innumerable small holes, through which a current of air is drawn by means of an exhaust fan. There is also an arrangement by which minute jets of hot water are thrown upon the newly formed hat-body to give it sufficient consistency to permit its removal from the cone. The fur is led through a tube to a revolving cylinder, which thoroughly opens and distributes the fur into the machine and spreads it evenly over the surface of the cone, which during this operation is inclosed in a tight box. When the fur is properly distributed the box is opened, and the jets of water are thrown upon the fur, and the embryo hat, over which a cloth is spread for its protection, is removed by hand. The whole operation takes but two or three minutes. The fur is then rolled and pressed, first by hand and then by machinery, to felt it and reduce it to its proper proportions. In the meantime it is sized to add to its strength and durability. An application of shellac dissolved in alcohol is used, a much stronger solution being required for a 'derby' than for a soft hat. Thus far the hat has retained its conical form, but the next step is to give it the hat shape. It is placed upon a mold, consisting of a block and a matrix, which shapes both the crown and brim. The next step is dyeing, after which the hair receives further shaping upon another block. This final block is adjustable, so that all the dimensions of a hat—size of band, height and diameter of crown, and width of brim—are accurately gauged by levers, so that of a given shape, every size can be made on the same block. Pouncing, which is a process of sandpapering to remove inequalities, follows, and is accomplished by placing the hat on a rapidly revolving block, and rubbing the surface with fine emery paper. The trimmings—that is, the sweat-band, the lining, and the ribbon binding—are now attached, and the hat given another shaping upon the block.

Wool hats are made by a different initial process. The wool, as it comes from the card in a continuous lap, is wound upon a machine consisting of two cones placed base to base and revolving upon an axis placed parallel to the end of the card. The double cone is so rotated that the continuous lap of wool is wound in a zigzag manner, crossing and recrossing from end to end. When a sufficient quantity of wool has been received, the machine is stopped, the double cone of wool is divided in the centre, the two resulting hat-bodies removed for felting, and the process repeated. The processes of felting, dyeing, stiffening, blocking, finishing, and trimming follow.

The silk hat, now universally known as an article of dress, is of comparatively modern use. It was known in Florence over a century ago; but its manufacture was not introduced into France till about 1825, and its development has taken place entirely since that time. A silk hat consists of a light stiff body, covered with silk plush of a brilliant glossy texture, the manufacture of which is the most important element in the industry. Originally the bodies were made of felt and various other materials, but now calico, muslin, or other cotton material is almost exclusively used. The muslin is first stiffened with a varnish of shellac, and then cut into pieces sufficient for crown, side, and brim. The side-piece is wound round a wooden hat-block, and its edges are joined by hot ironing, and the crown-piece is put on and similarly attached to the side. The brim, consisting of three thicknesses of muslin cemented together, is now

slipped over and brought to its position, and then a second side-piece and another crown are cemented on. The whole of the body, thus prepared, now receives a coat of size; subsequently it is varnished, and it is ready for the operation of covering. In covering this body, the under brim, generally of merino, is first attached, then the upper brim, and lastly the crown and side sewed together are drawn over. All these by hot ironing and stretching are drawn smooth and tight, and as the varnish of the body softens with the heat, body and cover adhere to each other at all points without wrinkle or pucker. Dressing and polishing, by means of damping, brushing, and ironing, come next, after which the hat is velured in a revolving machine by the application of haircloth and velvet velures, which cleans the nap and gives a smooth and glossy surface. The brim has then only to be bound, the linings inserted, and the brim finally curled, when the hat is ready for use. The plush used for silk hats is made almost wholly in France. For many years in all kinds of hat-making the French excelled, and in such centres as Anduze, Lyons, and Paris the trade is very extensive and important. In Great Britain the felt hat trade is principally centred at Denton and other localities in the neighborhood of Manchester, and in America the States of Connecticut, New York, and New Jersey enjoy the greater part of the industry.

The manufacture of straw hats has grown to be a large industry in the United States within recent years, and large quantities are annually exported. The straw braid, like all hat materials, is chiefly imported, coming from Italy, China, and Japan. The straw braid is sewed by machinery and shaped by means of a block, the pressing being done, frequently, with hydraulic machines. A sizing of glue is used to stiffen the hat before it is pressed. See STRAW MANUFACTURES.

Statistics.—In 1810 the number of fur hats reported as made in the country in one year was 457,666, of which 45,369 were made in Pennsylvania. According to the census of 1840, the value of the hats and caps of all kinds made annually in the United States was $8,704,342. At the census of 1850, 1048 establishments, with a capital of $4,427,798, were engaged in the manufacture of hats and caps. Half a century later 171 establishments were engaged in the manufacture of fur hats, and 24 of wool hats. The fur-hat industry engaged a capital of $16,701,308, and there was produced an annual output valued at $27,811,187. The wool-hat industry involved a capital of $2,050,802, and produced goods valued at $3,591,940.

HATASU, hä′tä-sōō, or **HATSHEPSET,** hăchĕp′sĕt (HATSHEPSU). An Egyptian queen of the Eighteenth Dynasty, also called Ramaka (or Ma-ka-ra) and Chnemt Amum. The daughter of Thotmes I., she was associated with him in the last years of his reign; became the concubine of his son Thotmes II., who succeeded his father; and, as guardian of his son, later Thotmes III., to whom she married her daughter, exercised a great influence over his brilliant reign, and was for some time practically sovereign, as is typified by her appearance on the monuments in male garb. The mutilation of her name in inscriptions points to a falling out between her and the young King, and probably to his complete assumption of power. From Southern Arabia an expedition sent out by Hatasu brought back rich treasure. The temple near Thebes, called Der el-Bahri, which is approached by a lane of sphinxes and is surrounded by obelisks, contains many of the records of her reign and an especially vivid representation of the expedition to Punt.

HATCH, EDWARD (1832-90). An American soldier in the Civil War, born in Bangor, Maine. He began his military career at Washington in 1861, but went West the same year, and rose rapidly from captain to be lieutenant-colonel of the Second Iowa Cavalry. By 1862 he was colonel of the same. He served under General Grant in the South, and after commanding the entire cavalry division in the Army of the Tennessee he was made brigadier-general (1864). His gallantry in the field caused his further promotion to the rank of major-general, and his transference from the volunteer to the regular army corps as colonel of the Ninth United States Cavalry. In this capacity he was engaged in military service in the far West after the war was over.

HATCH, EDWIN (1835-89). An English theologian, born at Derby. He was educated at Pembroke College, Oxford; was ordained deacon in 1858, and priest in 1859; from 1859 to 1862 was professor of classics in Trinity College, Toronto, Can., from 1862 to 1867 rector of the Quebec High School; and from 1867 to 1885 was vice-principal of Saint Mary Hall, Oxford. In 1883 he became rector of Purleigh, Essex, in 1884 university reader in ecclesiastical history and secretary to the boards of faculties. He was Bampton lecturer in 1880, Grinfield lecturer on the Septuagint from 1882 to 1884, and Hibbert lecturer in 1888. The degree of D.D. was conferred upon him by the University of Edinburgh in 1883. He was a founder (1870) and the first editor of the *Official Gazette.* In theology he was an independent thinker, who sought to effect at Oxford a scientific basis for that study. He published *The Student's Handbook to the University and Colleges of Oxford in 1873* (7th ed. 1883), but *The Organization of the Early Christian Churches* (Bampton Lectures, 1881) was his first important volume. This was rendered into German, by the eminent Dr. Harnack, as *Die Gesellschaftsverfassung der christlichen Kirchen in Alterthum* (Giessen, 1883). Other works by him were: *The Growth of Church Institutions* (1887), and *Greek Influence on Christianity* (the "Hibbert Lectures," edited by Dr. Fairbairn, 1890). His writings were read and discussed with interest in Scotland, Germany, and the United States, as well as in England. Consult an article by Harnack in the *Theologische Litteratur Zeitung* (1890).

HATCH, JOHN PORTER (1822-1901). An American soldier, born in Oswego, N. Y. He graduated at West Point in 1845, and went in 1846 to the war in Mexico as a lieutenant of infantry, but exchanged the following year for the mounted rifles, and was promoted for gallantry in the field during the Civil War, which he had entered as brigadier-general of volunteers. He joined the Regular Army in 1866, and rose to be colonel of the Second Cavalry Regiment, 1881, but retired in five years.

HATCH, RUFUS (1832-93). An American banker, born in Wells, York County, Maine. Removing to Illinois, he was first a clerk in a

grocery store at Rockford, after which he joined a surveying party on one of the earliest railroads in Wisconsin, and finally, in 1854, entered the grain commission business in Chicago, where he rapidly accumulated a fortune. In 1862 he removed to New York City, where he established a stock-brokerage business, and became well known as a dealer in and promoter of railway stocks. He managed the famous Chicago and Northwestern 'deal' in 1868, secured control of the Pacific Mail Steamship Company, and finally, after varying fortunes, failed in the Northern Pacific collapse in 1883.

HATCH, William Henry (1833-96). An American lawyer, born at Georgetown, Ky. He was admitted to the bar in 1854; served in the Confederate Army during the Civil War, and rose to the rank of lieutenant-colonel; was member from Missouri in the United States House of Representatives from 1879 to 1895, and during this time took a leading part in securing legislation for the benefit of the agricultural interests. He was largely responsible for the passage of the act, commonly known as the Hatch Act, granting Federal aid to agricultural experiment stations in all the States and Territories.

HATCHEL. See Hackle.

HATCHIE. A tributary of the Mississippi River. See Big Hatchie.

HATCHMENT, or **ACHIEVEMENT** (formerly *atchment*, *achement*, *atchcament*, an abbreviation of *achievement*, Fr. *achèvement*, from *achever*, OF. *achever*, *achiever*, to achieve, from *venir a chief*, Fr. *venir à chef*, to come to the head, or end). In heraldry, an escutcheon or armorial bearing; specifically, the armorial bearing placed on the residence of a person lately deceased. The funeral hatchment is in the form of a lozenge, upon which the shield is placed. The crest and other accessories are given, but in place of the motto a text or other religious legend is used. For a bachelor, the whole of the lozenge background is black. In the hatchment of an unmarried lady, the legend is omitted and a knot of ribbon takes the place of the crest. The hatchment of a husband whose wife survives impales his arms with his wife's in a shield with the external ornaments to which he is entitled, the ground of the hatchment being, under his side of the shield, black, and under his wife's, white. If the wife be an heiress, her arms are not impaled, but carried in an escutcheon (q.v.) of pretense. The arms of a wife whose husband survives are impaled with her husband's arms in a shield, or, in the case of an heiress, borne on an escutcheon of pretense. There is no helmet, crest, or mantling, but a peeress is entitled to her robe of estate. The ground under the dexter side of the shield is white, and under the sinister, black. The hatchment of a widower differs from that of a husband, in the ground being entirely black. The hatchment of a widow differs from that of a wife, both in having the ground entirely black, and in the form of the escutcheon, which (except in the case of an escutcheon of pretense) is lozenge-shaped. The arms are encircled by a silver cordon or cordelière, the symbol of widowhood. On the decease of the last of a family, a death's head surmounts the shield in place of a crest.

The achievement of a reigning king or queen, whether married or not, represents the royal arms complete on a ground entirely black. That of an archbishop or bishop has the insignia of his see impaled with his paternal arms, the whole surmounted by a mitre, and the ground is per pale argent and sable. The dean of a cathedral or collegiate church and a king-at-arms also impale the arms of office with their family arms. In the achievement of the wife of a prelate, there are two shields—the first containing the impaled arms of the see and the bishop, surmounted by a mitre; and the second, the family arms of the bishop with those of his wife. The ground is all white, except that part which is under the arms of the wife.

Funeral escutcheons in Scotland, France, and Germany differ considerably from those in use in England, in that they indicate not merely the right of the deceased to a coat of arms, but his gentility of descent. The hatchment is much larger, sometimes consisting of a lozenge above six feet square, and the arms of the deceased, which occupy the centre, are surrounded by those of the eight or sixteen families from whom he derived his descent, the paternal quarterings on the right side, and the maternal on the left. The deceased is not entitled to a hatchment unless all these families had a right to bear arms. On the four corners are death's heads and the initials and titles of the deceased; the black interstices are powdered with tears. See Heraldry.

HATCHWAY, Jack. A retired naval officer in Smollett's *Peregrine Pickle*. He is the boon companion of Commodore Trunnion.

HAT'FIELD. A market-town in Hertfordshire, England, on the Lea, 7 miles southwest of Hertford (Map: England, F 5). Population of parish, in 1891, 6963; in 1901, 7551. It is noted for the vicinity of Hatfield House, the seat of the Marquis of Salisbury, built on the site, and containing remains, of the famous Ely Episcopal Palace, erected in the twelfth century. It was acquired by Henry VIII. Edward VI. and Queen Elizabeth were both called to the throne while residents of the palace; James I. also resided here, and it was one of the prisons of Charles I. The present stately Elizabethan mansion, built 1608-11, and situated in extensive and beautiful grounds, contains valuable portraits and historical manuscripts. Consult Brewer, *English Studies*, edited by Wace (London, 1881).

HATFIELD, Edwin Francis (1807-83). An American Presbyterian clergyman, born in what is now Summit, N. J. He graduated at Middlebury College in 1829, studied theology at Andover, and was ordained in New York in 1832. He then became rector successively of the Second Presbyterian Church in Saint Louis and of the Seventh and North Presbyterian churches in New York. Ill health obliged him to give up preaching in 1863. He was for a time agent for the Union Theological Seminary, for which he raised a large sum of money, and for many years clerk of the Presbyterian General Assembly. He was the author of: *Universalism as It Is* (1841); *Saint Helena and the Cape of Good Hope* (1852); *The History of Elizabeth, N. J.*; *The Church Hymn-Book, with Tunes* (1872); and *The Poets of the Church* (1884). He left his library of 6000 volumes to Union Theological Seminary.

HATH'AWAY, Anne, or Agnes. The maiden name of Shakespeare's wife. See Shakespeare.

HATH'ERLY, Sir William Page Wood, Baron (1801-81). An English jurist, born in London, and educated at Winchester and Cambridge. He was called to the bar in 1827, and was Queen's Counsel eighteen years later. He entered Parliament for Oxford in 1847, and became a power in Church matters, and, though not a polished speaker, was highly respected for his knowledge and conscientiousness. From being a judge and a baronet he rose to be a peer of the realm and Lord Chancellor of Great Britain (1868), but retired in 1872. His personal benevolence influenced his Parliamentary career, and his piety is apparent in his published works, such as *Truth and Its Counterfeits* (1857), and *The Continuity of Scripture* (1867).

HATHOR, hä'thôr. An Egyptian goddess. See Athor.

HATIFI, hä'tê-fê, Abdallah (c.1460-1521). A Persian epic poet, nephew of Jami (q.v.), born at Khargird, in Herat. The last of the important epic poets, he wrote in rhymed couplets five poems: *Laila wa Majnūn*, a story of unhappy love (edited by Jones, 1788; and in lithograph, Lucknow, 1862); *Haft Manzar*, an imitation of Nizami's *Haft Paikar; Shirlim wa Khusru*, a tale of the love of a Hindu prince for a rajah's daughter, and remarkable as being based on contemporary fact, and not on conventional legend; *Tīmur Nāmah*, or *Zafarnāmah*, celebrating the deeds of Timur or Tamerlane, the most important historical epic after the *Sāhnāmah*, of which a part was published by Jones (1788; lithographed at Lucknow, 1869); and an uncompleted story of the glories of Shah Ismail. This pentad is one of the many imitations of Nizami's *Khamsah*. Hatifi is also the name of an earlier Persian poet, who wrote *Gui u Chaugān*, a poem on the relation of man to God under the figure of the ball and the racket—though afflicted and beaten, he must turn again to him who smote; and again of a Turkish poet of Amasia in Asia Minor, who wrote in the sixteenth century.

HATTALA, hä'tä-lä, Martin (1821-1903). A Czech philologist, born in the County of Arva, Hungary. He studied at Pressburg and Vienna; became a priest in 1848, but soon devoted himself to linguistics; was teacher in the Pressburg Gymnasium (1850-54), instructor (1854), and later professor of Slavic philology in the University of Prague. His writings comprise studies in Czech and Slovack phonetics and syntax. Especially to be noted is his defense of the authenticity of the manuscripts of Kvalove-Dvor and Grünberg, containing old epics and lyrics in Bohemian; also, *De Continuarum Consonantium in Linguis Slavicis Mutatione* (1867); attacks on Schleicher and others; and, with A. Patera, *Reliquiæ Metricarum Alexandreidon Palaobohemicarum* (1881). He also wrote on the phonetics of Bohemian and Slovack (1854); a comparative grammar of Bohemian and Slovack (1857); a Slovack grammar (1864); and *Brus jazyka českého*, a work on style and diction (1877).

HATTERAICK, hät'tēr-āk, Dirk. A smuggler in Scott's *Guy Mannering*.

HAT'TERAS, Cape. See Cape Hatteras.

HATTE'RIA, or Sphenodon. A genus of New Zealand 'lizards,' described in more detail under Tuatara (q.v.), which is the sole remaining representative of the group Prosauria, and is therefore of great interest as illustrating in its structure a "primitive, almost ideally generalized type of reptiles."

HATTI SHERIF, hät'tê shâ-rēf', or **HATTI HUMAYUN,** hōō'mâ-yōōn' (Turk., excellent writing, from Ar. *khaṭṭ*, script, line, from *khaṭṭa*, to trace, and *šarīf*, sublime, from *šarafa*, to surpass). The name given by the Turks to important rescripts of the Sultan. The hatti sherifs are composed in the Turkish language, and written in the Arabian court-hand Divani. Above the text, as a token of the authenticity of the rescript, stands the intricate flourish or mark of the Sultan, usually in black, but sometimes in red or gold. This flourish is called tugra, or rishani sherif. The hatti sherif is irrevocable, while the written decrees of the Sultan relative to matters not so important, called Irads, are arbitrary decisions or opinions of the ruler liable to be amended, and, in many instances, entirely abrogated.

HATTO, hät'tô. The name of two archbishops of Mainz. Hatto I. (c.850-913) became Abbot of Reichenau in 888, and Archbishop of Mainz three years later. He possessed great influence at the Court of the Emperor Arnulf, and after the death of the latter in 899 became the guardian of his infant son, Louis the Child. In the struggle between the German kings and the anarchic feudal nobility, Hatto was a zealous partisan of the monarchy, and brought to its aid a bold spirit, a crafty mind, and a conscience which balked neither at treachery nor murder. His haughty bearing and magnificent mode of life still further incensed the nobles, who hated him as the instrument of the royal power. The feeling with which he was regarded by the people as a whole is attested by the widespread legend that his body, after death, was carried off by the devil and flung into the crater of Mount Etna. Of greater authenticity is the story related of his perfidious conduct toward Count Adalbert of Babenberg, a noble of Thuringia, who had been at enmity with the Emperor, and who was induced by Hatto to seek the King's presence for the purpose of effecting a reconciliation, the Archbishop promising under oath to restore him unharmed to his castle. After the two had started on their journey from Adalbert's home, Hatto found some pretext for returning with his unsuspecting companion to the castle, thus fulfilling the letter of his vow. Setting out once more, they arrived at the royal camp, where Adalbert was put to death. Hatto is also the hero of the well-known legend connected with the Mouse Tower, situated on an island in the Rhine, near Bingen. During a famine, as the story goes, the Archbishop caused a number of poor people to be burned in a barn, comparing their cries of agony to the squealing of mice. He was thenceforward pursued by a plague of these animals, to escape which he built the tower on a rock in the Rhine. He could not, however, evade his persecutors, and was finally devoured by them. This story, however, is told with slight variations of several historic characters, and is quite as frequently associated with his namesake, Hatto II., who was Archbishop of Mainz from 968 to 970. Consult:

Heidemann, *Hatto I., Erzbischof von Mainz* (Berlin, 1865); Baring-Gould, *Curious Myths of the Middle Ages* (London, 1866-67).

HAT'TON, Sir Christopher (1540-91). An English statesman and jurist, born at Holdenby. He became a member of the Inner Temple (1559), sat in the Parliaments of 1571, 1572, 1584, and 1586, and showed himself a bitter enemy of the Jesuits. Parry, who defended them in Commons, Hatton accused, and finally had him condemned to death. He was a commissioner at the trial of Babington, of the conspirators against Elizabeth, and of Mary Stuart, and in general showed himself a clever courtier of the Queen. In 1587 she made him Lord Chancellor—the 'dancing Chancellor,' as he was called, in allusion to the story that the Queen first looked on him with favor when she saw him dancing. In literary history Hatton is best known as the patron of Spenser, who dedicated to him *The Faerie Queen.* Consult Nicolas, *Memoirs of the Life and Times of Sir Christopher Hatton* (London, 1847).

HATTON, Frank (1846-94). An American journalist, born in Cambridge, Ohio. He learned the newspaper business in the office of his father, who edited the Cadiz (Ohio) *Republican.* He served through the Civil War, attaining the rank of first lieutenant, and then became a journalist in Iowa, finally becoming editor-in-chief of the *Burlington Hawkeye.* In 1881 he was appointed Assistant Postmaster-General, and three years later succeeded Walter Q. Gresham as Postmaster-General, thereby becoming the youngest Cabinet officer since Alexander Hamilton. He was for some time editor-in-chief of the *Mail* in Chicago, and in 1888 returned to Washington, where he edited the *Post.*

HATTON, Joseph (1841—). An English journalist, novelist, and playwright, born at Andover. He was educated at home and in Chesterfield, and began his literary career by writing for the *Derbyshire Times,* a paper his father had founded. In 1868 he went to London to edit and transform the *Gentleman's Magazine,* and was soon correspondent for German, Australian, and American papers, while he made frequent visits to the United States in the interests of English journals. His popular *Cigarette Papers* appeared first in the *People,* of which he became editor in 1900. His Eastern travels bore fruit in *The New Ceylon* (1881), and he brought out *Henry Irving's Impressions of America* (1884); but he is best known as the author of such novels as: *Under the Great Seal* (1893); *The Banishment of Jessop Blythe* (1895); *The Dagger and the Cross* (1897); *When Rogues Fall Out* (1899); and *In Male Attire* (1900). His romance, *John Needham's Double,* was dramatized for E. S. Willard, and Richard Mansfield produced his version of *The Scarlet Letter.* Hatton also arranged *The Prince and Pauper* for his daughter Bessie, and *Jack Sheppard* for Weedon Grossmith. One of his novels, *By Order of the Czar,* had the distinction of being condemned by the Russian censor.

HATTON, Joseph Liptrot (1809-86). An English musical composer, born in Liverpool. With much natural ability, inherited from father and grandfather, both violinists, he was never thoroughly educated, and but one of his songs, "To Anthea," ranks as a classic. He wrote about three hundred in all, and many of them were as popular as the composer himself. A versatile genius with a sense of humor, he filled many rôles—organist at sixteen years of age; actor with Macready in *Othello* (1832); conductor of chorus in English opera (1842-43); composer of pianoforte pieces and an operetta, *Queen of the Thames;* interpreter of Bach's fugues without the notes; and vocalist at the Hereford Musical Festival (1846). He went on concert tours with Vieuxtemps, Sims Reeves, and other artists, and upon one of his American visits stayed for two years. From 1853 to 1859 he was musical director at the Princess's Theatre under Charles Kean, and when the Ballad Concerts were started at Saint James's Hall, London, in 1866, Hatton was the accompanist and conductor till 1875. He edited song albums for Boosey & Co., attempted oratorio as well as opera, and his part songs are still sung. He died at Margate, and was buried in Kensal Green.

HÄTZER, hĕts'ẽr, Ludwig (c.1500-29). A prominent Swiss Anabaptist. He was born at Bischofszell, near Saint Gall, Switzerland; studied at Freiburg im Breisgau, and attained high rank as a scholar, particularly in Latin, Greek, and Hebrew. He was intimate with Zwingli, but being a radical he desired to move faster than Zwingli thought prudent. In the fall of 1524 he returned to Zurich and openly allied himself with the Anabaptist party. He published a German translation of Œcolampadius's book upon the sacraments; but his continued rejection of infant baptism alienated Zwingli from him, and in March, 1526, he was banished. He went to Basel, where he translated Malachi, with Œcolampadius's commentary (1526), and finally to Strassburg, where he finished, with Johann Denk, a translation of the Prophets (1527), which he published at Worms. He returned to Augsburg, only to be banished again (spring, 1528). He wandered to Constance, and on the trumped-up charge of having seduced the servant of his wife, he was beheaded after three months' imprisonment, February 4, 1529. So bitter is still the feeling against the Anabaptists that even to-day he is represented as having been immoral and justly condemned. His very name has been spelled in an opprobrious manner, Hetzer, meaning irritator.

HATZFELD, häts'fĕlt, or (Hungarian) **ZSOMBOLYA,** zhôm'bô-lyŏ. A small town, in the County of Torontál, Hungary, 152 miles southeast of Budapest, in a very fertile district (Map: Hungary, G 4). Wheat, corn, and rape are raised, and horses are exported. Hatzfeld is the principal settlement of the Swabians of Southern Hungary, who recaptured the town from the Turks in 1718, and redeemed the district from swamps. Population, in 1890, 9600; in 1900, 10,152; mostly Catholic Germans.

HAUBERK, hą'bẽrk (from OF. *hauberc, halberc,* Fr. *haubert,* from MHG., OHG. *halsberc, halsberge,* AS. *halsbeor,* hauberk, from OHG., MHG., Goth. *hals,* Ger. *Hals,* AS. *heals,* neck; ultimately connected with Lat. *collum,* neck + OHG. *bergan,* MHG., Ger. *bergen,* Goth. *bairgan,* AS. *beorgan,* to protect). In mediæval armor, a defense for the body consisting of a shirt made of steel. Originally the hauberk was only a protection for the neck, and was made of thick leather. Later it was made of chain mail, and at the end of the eleventh century was joined to

the mail shirt or byrnie (q.v.), the name being applied to the whole garment. In the twelfth century the sleeves of the hauberk sometimes terminated at the elbow, but in the thirteenth and fourteenth centuries these came down to the wrist, and very generally descended over the hand in the form of a glove or mitten. In the fourteenth century the hauberk was sometimes worn under plate armor. See ARMOR.

HAUBOLD, hou'bôlt, CHRISTIAN GOTTLIEB (1766-1824). A German jurist of the historical school, born at Dresden and educated at Leipzig, where he became professor in 1789. He wrote: *Institutiones Juris Romani Literariæ* (1809); *Institutionum Juris Romani Privati Lineamenta* (last ed., by Otto, 1826); *Manuale Basilicorum* (1819); *Doctrinæ Pandectarum Lineamenta* (1820); and the excellent *Lehrbuch des sachsischen Privatrechts* (3d ed., by Hänsel, 1847-48).

HAUCH, houk, JOHANNES CARSTEN (1790-1872). A prolific Danish poet and dramatist. Born at Frederikshald, in Norway, of Danish parents, he came to Denmark (1803) when his mother died, and fought against the English in 1807. He entered the university at Copenhagen in 1808, and was made a doctor in 1821. Through association with Oehlenschläger, he became an apostle of literary reform. He wrote many dramas of little importance. Then in 1834 he turned to prose fiction, in which field he wrote: *Vilhelm Zabern* (1834), the most admired; *Guldmageren* (1836); *En polsk Familie* (1839); and *Slottet ved Rhinen* (1845). In 1842 he published a collection of poems. In 1846 he was made professor of Scandinavian languages at Kiel, but returned to Copenhagen in 1848, and now wrote many good tragedies, such as: *Söstrene paa Kinnekullen* (1849); *Marsk Stig* (1850), the best; *Tycho Brahe's Ungdom* (1852); and *Julian den Frafaldne* (1868). He wrote also an historic epic, *Valdemar Atterdag* (1862), and a second collection of poems (1861). He succeeded Oehlenschläger as professor of æsthetics at Copenhagen in 1851. Of strong imagination and with a bent for the mystic and supernatural, his work at its best is admirable, but its average is not high. Hauch's *Dramatic Works* appeared in three volumes (Copenhagen, 1852-59); his romances in seven (ib., 1873); and his poems have also been collected (ib., 1890 et seq.). Consult Brandes, *Danske Digtere* (Copenhagen, 1877).

HAUCK, houk, ALBERT (1845—). A German Lutheran theologian, born at Wassertrüdingen, in Middle Franconia. He studied at the universities of Erlangen and Berlin, and in 1882 became a professor at Erlangen, where he remained until 1889, when he went to the University of Leipzig. In 1891 he was elected a member of the Royal Academy of Sciences. His writings include: *Tertullians Leben und Schriften* (1877); *Die Bischofswahlen unter den Merowingern* (1883); *Kirchengeschichte Deutschlands*, in six parts (parts 1-3, 1887-96; parts 1-4, 2d ed. 1898-1902). As a reward for these labors he was given the great Verdun prize by the Prussian Academy of Sciences (1899). In 1881 he became an editor of the revised edition of the *Realencyklopädie für protestantische Theologie und Kirche* (3d ed. 1896), and after Herzog's death in 1882, the sole editor.

HAUENSCHILD, hou'en-shilt, RICHARD GEORG SPILLER VON (1825-55). A German poet and novelist, born in Breslau, better known under his pseudonym, 'Max Waldau.' He began the study of law in the university of his native city, but soon forsook it for modern languages, history, and philosophy. He was one of the most gifted German poets of the first half of the nineteenth century. His poems include: *Blätter im Winde* (1848); the epics *Cordula*, *Graubündner Sage* (2d ed. 1855) and *Rahab* (1855); and the elegy, *O diese Zeit! Kanzonen* (1850). Of his novels, the humorous romances, *Nach der Natur* (2d ed. 1851), and *Aus der Junkerwelt* (1850), are most noteworthy.

HAUER, hou'ēr, FRANZ VON (1822-99). An Austrian geologist, born at Vienna, and educated there and at Schemnitz. In 1846 he became an assistant of Haidinger, and from 1849 to 1867, as a member of the Imperial Geological Institute, and later as its director, took part in many geological surveys. In 1885 he was appointed superintendent of the Vienna Museum of Natural History, and edited its *Annalen* (1886-96), and for the last seven years of his life was a member of the Austrian House of Lords. His published works include: *Geologische Uebersicht der Bergbaue der österreichischen Monarchie* (1855), with Foetterle; *Die Geologie und ihre Anwendung auf die Kenntnis der Bodenbeschaffenheit der österreichisch-ungarischen Monarchie* (2d ed. 1878); and a *Geologische Karte von Osterreich-Ungarn* (5th ed. 1896). Consult Böhmersheim, *Zur Errinnerung an Franz von Hauer* (Vienna, 1899).

HAUFF, houf, WILHELM (1802-27). A German novelist, born at Stuttgart. His education was desultory, and revealed no precocity; his effective training came from his mother and sisters, and tended to cultivate the imagination rather than the intellect. He studied theology at Tübingen (1820-24), and in 1826 published his first volume, *Märchenalmanach*, followed by two sequels of like title, all marked by a singularly dramatic humor. Equally successful were the *Mitteilungen aus den Memoiren des Satans* (1826), and *Der Mann im Monde* (1826), the last under the name of H. Clauren, a lesser novelist, whose sentimentality it was intended to parody. This it did so successfully as to deceive Clauren's most enthusiastic admirers. His best romance is his *Lichtenstein* (1826). It is a vivid series of historical pictures of men and manners, and has held its popularity for three generations. Hauff traveled in Germany, France, and Belgium, became editor of the Stuttgart *Morgenblatt*, and married. The summer of 1827 he passed in the Tyrol, still at work; but in September his health began to fail, and in October he died. To 1827 belong the *Phantasien im Bremer Ratskeller; Das Bild des Kaisers;* and *Die Bettlerin vom Pont des Arts.* Among the other collected *Tales*, the best are: *Das Wirtshaus im Spessart; Othello; Jud Süss;* and *Die Sängerin.* Hauff's *Works* are still often reprinted, and enjoy undiminished popularity. In his early death Germany lost a writer of unusual ability and rich promise.

HAUG, (JOHANN CHRISTOPH) FRIEDRICH (1761-1829). A German poet, known also by his pen-name 'Hophthalmos,' born at Niederstolzingen (Württemberg). He studied in Stuttgart at the Karlschule, or military institute of Duke Karl Eugen, where he was one of the Schil-

ler group; in 1783 was appointed a secretary to the Ducal Board of Privy Councilors, in 1794 private secretary, and in 1816 librarian of the Royal Public Library at Stuttgart, with the title of Aulic Councilor. Ready in improvisation, he wrote quantities of neat but rather commonplace verse for literary almanacs, anthologies, and journals, and for Cotta's *Morgenblatt*, of which he was an editor from 1807 to 1817. As an epigrammatist, however, he was perhaps second only to Logau (q.v.). The most representative exercise of his wit is to be found in his *Zweihundert Hyperbeln auf Herrn Wahls ungeheure Nase* (1804, 3d ed. 1850), a *tema con variazioni*, which certainly to unprejudiced minds attests his mobility and resourcefulness. A selection from his *Gedichte* appeared at Stuttgart in 1840; another forms No. 1136 of Reclam's *Universalbibliothek*. Consult Fischer, *Beiträge zur Litteraturgeschichte Schwabens* (Tübingen, 1901).

HAUG, houg, Martin (1827-76). A German Orientalist, born at Ostdorf, in Württemberg. Overcoming every obstacle to his early education, he became a school-teacher, first at Ostdorf and later at Unternsingen. Here he was forced to continue his classical and Hebrew studies in secret; but he persevered, and developed a taste in linguistics and Sanskrit. Haug entered the gymnasium at Stuttgart in 1848, and in 1852 received the degree of doctor of philosophy at Tübingen. Until 1859 his work was mainly at Bonn and Heidelberg, but in that year he was appointed superintendent of Sanskrit studies at the Government College at Poona, India. Leaving Europe with his bride, he went to India, where he worked unceasingly in Sanskrit, Avestan, and Pahlavi, in addition to the task of reforming the system of native education. In 1866 Haug returned to Germany, and two years later was appointed to the newly created chair of Sanskrit and comparative linguistics at Munich, which he held until his death. Haug's work was of signal importance for Indo-Iranian studies in the Orient. He was the first to recognize the importance of the traditional interpretation of the texts as contrasted with the linguistic or comparative school; and his books, though comparatively few in number, are still, for the most part, of value. His chief contributions were: *Die fünf Gâthâs* (2 vols., 1858-60); *The Aitareya Brahmana of the Rigveda* (2 vols., 1863); *An Old Zend-Pahlavi and Pahlavi-Pazand Glossary*, in collaboration with Hoshengji Jamaspji (2 vols., 1867-70); *The Book of Arda Viraf*, in collaboration with E. W. West (2 vols., 1872-74); and *Essays on the Parsis* (3d ed. 1884). Consult Evans, in West's edition of the essays.

HAUG, Robert (1857—). A German artist, born in Stuttgart. His studies were begun at the Art School of Stuttgart, and continued at Munich in the academy, the Old and New Pinakothek, and the Schack Gallery. At the Munich International Exposition of 1888 he attracted very favorable notice by his two works, "The Prussians Near Möckern" (in the Stuttgart Gallery) and "Volunteer Riflemen of 1813" (in the National Gallery, Berlin), the latter of which also obtained the gold medal at the Berlin Art Exposition in 1891. He became an instructor in the Stuttgart Art School in 1894. His further works, for the most part scenes from the War of Liberation, characterized particularly by fine atmospheric effects, include "At Dawn" (1891; Dresden Gallery); "The Approach of Blücher's Army to the Rhine" (1893), "Fight in the Streets of Leipzig, October, 1813" (1895; Leipzig Museum); "The Castle Guard," and "Battle in a Cornfield" (National Gallery, Berlin).

HAUGIANS, hou'gĭ-*anz*. A religious body in Norway, the followers of Hans Nielsen Hauge (1771-1824). He was an ignorant peasant, but became an enthusiastic revival preacher early in the nineteenth century, and so annoying to the regular clergy that they procured his punishment by fine and imprisonment. He held that the ministry is a common duty, and that ordination for the service is not necessary; that Church creeds and confessions are of small account, but faith and works are everything; and he laid much stress upon strict discipline. He gained many followers, particularly from the lower classes, and his work was continued after his death. For the life of Hauge, consult Bang (Christiania, 1875). His name is commemorated in Hauge's Synod, one of the independent Lutheran bodies of the United States. The synod was organized in 1846-50 by immigrants from Norway. Its main strength is in the States of Minnesota, South Dakota, and Wisconsin.

HAUGWITZ, houg'vĭts, Christian Heinrich Karl, Count (1752-1831). A Prussian statesman, born near Oels, in Silesia, and educated at Halle and Göttingen. His mystical philosophy won him the favor of Frederick William II., who sent him to Vienna as Ambassador, and in 1792 appointed him Minister of Foreign Affairs. During his administration the second partition of Poland took place (1793), and the humiliating Peace of Basel was signed (1795). When the French occupied Hanover in 1803, Haugwitz resigned; but two years later, when the French troops had entered Ansbach, he was sent to treat with Napoleon, and after Austerlitz signed the treaty ceding Ansbach, Cleves, and Neuchâtel to the French, and giving Hanover to Prussia. Soon after he replaced Hardenberg as Prime Minister, but was unable to better the relations with France, and after Jena retired to his estates in Silesia and Poland. Consult Minutoli, *Der Graf von Haugwitz und Job von Witzleben* (Berlin, 1844).

HAUK, Minnie (1852—). An American dramatic soprano. She was born in New York, of German parentage, and studied both at home and in Europe. Her first appearance was on the concert platform in New Orleans (1865), and three years later she made her operatic début in New York City. The same year she appeared in Italian opera in London with great success. The following year she was engaged as the prima donna of the Vienna Court Opera, and from 1873 to 1875 was employed in a like capacity at Berlin. She also sang with marked success in every capital of the civilized world.

HAUKSBEE, hąks'bê, Francis, the elder (?-c.1712). An English physicist, admitted to the Royal Society of London in 1705, and who made a number of brilliant discoveries. Little is known of his life save through his scientific papers which were published in the *Philosophical Transactions*, and a volume on *Physico-Medicinal Experiments on Various Subjects, Containing an*

Account of Several Surprising Phenomena Touching Light and Electricity Producible on the Attraction of Bodies. He discovered that light could be produced by mercury shaken in a glass tube, and that this effect was increased when the action took place in a vacuum. Hauksbee devised one of the first electrical machines, and also made improvements in the air-pump. He is supposed to have died in 1712, his last papers in the *Philosophical Transactions* appearing posthumously in 1713. He is mentioned by Newton in certain letters.

HAUKSBEE, Francis, the younger (1687-1763). An English optician, possibly a son of the foregoing. He was for forty years previous to his death clerk and housekeeper of the Royal Society, London. He was somewhat of a scientist, being an instrument-maker and optician, and is said to have been the first to deliver scientific lectures with experiments in London. "A Course of Mechanical, Optical, and Pneumatical Experiments" was given by Hauksbee, who performed the experiments while the explanatory lecture was delivered by William Whiston, M.A. The syllabus of this course of lectures, as well as those on astronomy and chemistry, is interesting as showing the state of experimental science at that time.

HAULIK DE VÁRALJA, hou'lĭk dâ vä'rŏl-yŏ, Georg (1787-1869). A cardinal and archbishop of Agram, born at Tyrnau in Hungary. He was a very aggressive and determined adversary of Kossuth, who in 1849 proscribed him as a traitor. His *Selectiones Encyclicæ Literæ et Dictiones Sacræ* (1850-53), a collection of pastoral letters, is of value to historical study.

HAULLEVILLE, ôl'vēl', Prosper Charles Alexandre, Baron de (1830—). A Belgian publicist, born in Luxemburg, of a French immigrant family from Lorraine. He studied law at Liège, Brussels, and Bonn, and then entered Belgian politics as a member of the Constitutional-Catholic Party. He was editor at various times of *L'Universel*, the *Revue Générale*, and the *Journal de Bruxelles*. His books include: *Histoire des communes lombardes depuis leur origine jusqu'à la fin du XIIIème siècle* (1858); *La définition du droit* (1875); and *De l'avenir des peuples catholiques* (1876), the last of which was translated into nine languages, and procured him the position of Papal chamberlain.

HAUNTED MAN, The. A Christmas story by Charles Dickens (1847).

HAUPT, houpt, Erich (1841—). A German Protestant theologian, born at Stralsund, and educated at Berlin. He was professor of New Testament exegesis, successively at Kiel (1878), Greifswald (1883), and Halle (1888). He wrote: *Der erste Brief des Johannes* (1869); *Die alttestamentlichen Citate in den vier Evangelien* (1871); *Die Kirche und die theologische Lehrfreiheit* (1881); *Plus ultra, zur Universitätsfrage* (2d ed. 1890); *Die Bedeutung der heiligen Schrift für den evangelischen Christen* (1891); *Zum Verständnis des Apostolats im Neuen Testament* (1896), etc.

HAUPT, Herman (1817—). An American engineer, born in Philadelphia, Pa. He graduated at West Point in 1855, but resigned a commission in the Second Infantry to become an assistant engineer on the public works of Pennsylvania. In 1844 he became professor of civil engineering and mathematics in Pennsylvania College, but three years later he resumed the practice of his profession, as principal consulting engineer of the Philadelphia Railroad, of which he became, successively, the general superintendent and chief engineer. He was chief engineer of the Hoosac Tunnel from 1856 to 1861. In the Civil War he was chief of the United States Bureau of Military Railroads, and served on the staff of General McDowell with the rank of colonel. From 1872 to 1876 he was general manager of the Piedmont Air-line Railroad, from 1876 to 1878 was chief engineer of the Pennsylvania Transportation Company and Seaboard Pipe-line, from 1881 to 1885 was general manager, and 1885 to 1886 was general superintendent of the Northern Pacific Railroad. He invented a drilling machine that won the highest prize of the Royal Polytechnic Society of Great Britain, and was the first to prove the practicability of transporting oil in pipes. He wrote: *Hints on Bridge Building* (1840); *General Theory of Bridge Construction* (1852); *A Consideration of the Plans Proposed for the Improvement of the Ohio River* (1855); *Military Bridges* (1864).

HAUPT, Lewis Muhlenberg (1841—). An American civil engineer, born in Gettysburg, Pa. He was educated at Harvard and at West Point, became lieutenant of lake surveyors by 1868, and in the following year was attached to a military district in Texas. From 1872 to 1892 he was professor of civil engineering in the University of Pennsylvania, and in 1885-86 was editor of the *Engineering Register*. In 1886 he invented a method for marking channels. He was a member of the Nicaraguan and the Isthmian Canal Commissions (1897-99), was president of the Colombia-Canea Arbitration (1897), and was chief engineer of the survey for ship canals across New Jersey, and was consulting engineer on the construction of the Ohio-Lake Erie ship canal. In addition to his numerous contributions to engineering journals, his publications include: *Working Drawings and How to Make and Use Them* (1881); *The Topographer—His Methods and Instruments* (1884); *Physical Phenomena of Harbor Entrances* (1887); *Canals and Their Economic Relation to Transportation* (1890); and *A Move for Better Roads* (1891).

HAUPT, houpt, Moritz (1808-74). A well-known German philologist. He was born at Zittau, and studied from 1826 to 1830 at Leipzig, where in 1841 he was appointed professor of the German language and literature. For having participated in the agitation of 1848-49, he was deprived of his professorship. In 1853, however, he was called to Berlin to succeed Lachmann as professor of classical literature. In 1861 he became perpetual secretary of the Academy of Sciences. By his painstaking and scholarly critical work he rendered distinguished service to both classical and German philology, chiefly as an editor of texts. In the former field he published: *Quæstiones Catullianæ* (1857); *Observationes Criticæ* (1841); editions of Horace (4th ed. 1881), Catullus, Tibullus, Propertius (5th ed. 1885), Vergil (2d ed. 1873), and other classical writers. His chief contributions to German philology were editions of Hartmann von Aue's *Erec* (1839), *Lieder und Büchlein*, and *Der arme Hein-*

rich (1842); Rudolph von Ems's *Der gute Gerhard* (1840); the poems of Gottfried von Neifen (1851); and the *Moritz von Craon* (1858), and *Von dem übeln Weibe* (1871) of Neidhard von Reuenthal, and, above all, Konrad von Würzburg's *Engelhard* (1844, new ed. 1890). He also edited Æschylus from the papers of Hermann (2d ed. 1858), and completed Lachmann's edition of the Mediæval German lyrics of the Minnesingers (*Des Minnesangs Frühling*, 4th ed. 1888). In 1836, with Hoffman von Fallersleben, he founded the *Altdeutsche Blätter*, succeeded in 1841 by the *Zeitschrift für deutsches Altertum*, which he edited until his death. His numerous briefer contributions are collected in his *Opuscula* (3 vols., 1875-76); and his *Französische Volkslieder* appeared posthumously in 1877. Consult: Belger, *Haupt als akademischer Lehrer* (Berlin, 1879); and Nettleship's lecture (Oxford, 1879).

HAUPT, PAUL (1858—). A Semitic scholar, one of the pioneers of Assyriology in America. He was born at Görlitz, Germany, November 25, 1858. He studied at the universities of Berlin and Leipzig. In 1880 he became privat-docent in the University of Göttingen, and from 1883 to 1889 was assistant professor of Assyriology. In 1883 he became professor of Semitic languages at Johns Hopkins University, but until 1889 continued to lecture in the summer at Göttingen. Besides numerous smaller articles, he projected and edits the *Polychrome Bible*, a critical edition of the Hebrew text of the Old Testament, and a new English translation with notes. A unique feature of this edition is the use of different colors to distinguish the various sources and component parts in the Old Testament books—each one of which is intrusted to a specialist in biblical studies. Among his Assyriological publications may be mentioned his edition of the *Nimrodepos* (the Gilgamesh epic, 1884-91); *Akkadische und sumerische Keilschrifttexte* (1881-82); *Die akkadische Sprache* (1882); and *Sumerische Familiengesetze* (1883). He is also co-editor with Friedrich Delitzsch of the *Beiträge zur Assyriologie und semitischen Sprachwissenschaft*, published in Leipzig.

HAUPTMANN, houpt'mân, GERHART (1862—). One of the greatest of modern German dramatists. He was born in Salzbrunn, son of a hotel-keeper, and grandson of a weaver. His first work, *Promethidenlos* (1885), was an epic. His dramas, *Vor Sonnenaufgang* (1889), *Das Friedensfest* (1890), *Einsame Menschen* (1891), and *Die Weber* (1892), show the influence of Zola, Ibsen, and Tolstoy, a spirit of revolt against the social conditions and the artistic ideals of a military and capitalistic State. Thus the young Hauptmann, with the young Sudermann, was for a time leader of a second Young German movement, and the production of *Vor Sonnenaufgang* at the Free Theatre of Berlin was the signal for a contest, recalling in a way that over the *Cid* or *Hernani*. The quiet and retiring poet became at once a notoriety. These dramas were aggressively democratic, social, realistic. His actors are no longer persons or characters, they are described as 'people in action,' who walk, talk, and act as in every-day life, or at least seem to do so, by an art that hides art. And it is every-day life of which they speak, the sordid social struggles of to-day in which they are engaged, the vulgar vices that hold them in a gloomy, brutal grasp. This naturalism is as pessimistic as that of Zola. *Die Weber* constantly suggests *Germinal*, but the poet and the artist in Hauptmann here rises above the theorist and the philosopher. The idealist is not defeated, but is learning to lift ugliness itself to the realm of art.

Up to 1892 Hauptmann might have seemed morbidly ethical in tragedy. He was now to show himself in *Kollege Crampton* (1892) and *Der Biberpelz* (1893) capable of painting delightful pastels of humorous character, though it is here with a professional thief and there with a drunkard that we have to do. And presently in *Hannele* (1893) he was to reveal himself in still another character as an extreme idealist, dealing no longer with vice, hunger, and mental decay, but with dreams, fantasies, and faith. *Hannele* is a mystic poem. So is *Florian Geyer* (1895), and *Die versunkene Glocke* (1897, translated by Meltzer, 1900) calls itself 'a fairy drama.' Then may be noted in *Fuhrmann Henschel* (1898) a turn from mysticism to an idealized realism in a situation suggesting that of Balzac's *La rabouilleuse*, though its fundamental naturalism is tempered by a spiritual restraint that comes from a great poet's moral intuition. Here Hauptmann has touched earth again as the poet of social altruism, giving to the German working class an artistic expression of their own weakness, and of the selfish strength of others. He is here the poet of the poor, the downtrodden, the lonely, the helpless, the perplexed, even the vicious. He recognizes the individualism produced by the material struggle for existence and wealth, but he would convert it to new ends by the inspiration of a Christian socialism. *Schluck und Jau* (1900), a farce, is a romantic adaptation of an Arabian tale, and Hauptmann's next drama, *Michael Kramer* (1900), while abounding in lines of sententious eloquence, is sordid in subject, and proved on the stage a melancholy failure. Hauptmann wrote also two novelistic studies, *Der Apostel* and *Bahnwarter Thiel* (1892).

HAUPTMANN, houpt'mân, MORITZ (1792-1868). A German composer and eminent writer on the theory of music, born at Leipzig. He was educated as a musician, and studied the violin under Spohr. His opera, *Mathilde* (1826), was very successful, but it was not until 1842, when he became cantor and musical director at the Thomasschule in Leipzig, that his genius as a teacher was universally acknowledged. His pupils, among whom were F. David, Kiel, Joachim, Sullivan, Von Bülow, and Cowen, cherished an enthusiastic admiration for him, and at his death Leipzig was in mourning. Of his compositions, all of which are marked by purity and beauty of style, the best are his violin pieces. He embodied the result of many years' labors in his *Die Natur der Harmonik und Metrik* (1853, 2d ed. 1873; Eng. trans. 1888), which was a work of paramount importance and the foundation of modern musical theory.

HAURAKI (hou-rä'ké) **GULF.** An inlet on the east coast of North Island, New Zealand, 70 miles long and 40 miles broad. The Great Barrier Island forms a natural breakwater at its entrance, and it contains numerous picturesque islands and good harbors. Auckland and Thames are the chief towns on its shores.

HAURAN (Arabic *el-Hauran*, Gk. *Αὐρανῖτις*, *Auranitis*). A district of Syria, east of the Jordan (Map: Turkey in Asia, G 6). In a wider sense the name is used to designate the Turkish province including Hauran proper, Jedur, Jaulan, and part of the hill-country south of the Yarmuk. Whether the Hauran mentioned by Asshurbanipal (B.C. 668-626), on the Rassam cylinder (vii. 111), was intended as a designation of this larger territory cannot be determined. But in Ezek. xlvii. 16 18, Jaulan is clearly included in the description. In a narrower sense Hauran extends east of Jaulan to the desert and from the district of Damascus to the Yarmuk. This tract of land includes: (1) en-Nukra, 'the cavity'; (2) el-Leja, 'the refuge'; and (3) el-Jebel, 'the mountains.' En-Nukra is a hollow east of Jaulan, south of el-Leja, and west of Jebel ed-Druze, 1500 to 2000 feet above sea-level, with an exceedingly rich soil, formed by decomposed volcanic matter. El-Leja is composed entirely of lava found in great masses and in fantastic shapes, with little vegetation. El-Jebel is the high mountain region, with the lofty peaks of el-Kuleib and the fortress of Salkhad. The oldest monument is probably the so-called Job-stone at Sheikh Saad, which is now known to have been erected by Rameses II. (about B.C. 1300). The underground dwellings are no doubt much older. None of the cities of which ruins now exist can be regarded as older than the Græco-Roman period; but there may have been older cities on the same sites. Great houses, built entirely of basalt, have been perfectly preserved, and arouse the amazement of travelers. Numerous Greek inscriptions have been found, both Christian and pagan. A railroad extends from Damascus to Mzerib. Consult: Wetzstein, *Reisebericht über Hauran und die Trachonen* (Berlin, 1860); Schumacher, *Across the Jordan* (London, 1883); Merrill, *East of the Jordan* (New York, 1883); G. A. Smith, *Historical Geography of the Holy Land* (London, 1895).

HAURÉAU, ō'rā'ō'. JEAN BARTHÉLEMY (1812-96). A French historian and politician, born in Paris. He was educated in the colleges of Louis le Grand and Bourbon, and became a revolutionary writer on the staff of several metropolitan newspapers before he went to edit the *Courrier de la Sartha* (1838-45) in Le Mans, where he also became city librarian. Thence he returned to the *National* in Paris, and after the Revolution of 1848 he was made keeper of the manuscripts in the National Library, retaining the position until the coup d'état of December 2, 1852. He was sent by the Department of Sarthe to the Constituent Assembly, after the dissolution of which he abandoned politics. He was made librarian of the Ordre des Avocats in 1861, and director of the National Printing Office in 1870, but retired in 1882. He was commander of the Legion of Honor from 1878. He wrote *François I. et sa cour* (1853); *Charlemagne et sa cour* (1854); *Gallia Christiana* (1856-65); and *Histoire de la philosophie scholastique* (1872-80), his best-known work.

HAU'RIENT (from Lat. *hauriens*, pres. part. of *haurire*, to draw water). A term in heraldry (q.v.), applied to a fish placed upright per pale.

HAUSA (hou'sȧ) **STATES**, or **HAUSA LAND**. A term of ethnographical rather than geographical significance. It now designates that part of Nigeria (q.v.) which lies north of the Benue and Niger rivers. It embraces the kingdoms of Sokoto (q.v.) and Nupe. The former includes the sub-sultanate of Gando, and the Kalam, Muri, Bautchi, and Jauri territories, and the Adamawa Empire. Bornu borders on the east, and the Niger from Lokodja to Birni borders on the west. The total area is estimated at 150,000 square miles, with about 4,000,000 inhabitants. The Hausa people are negroes with much admixture of other races—Tuareg, Berber, Fulah, etc. Their cranial index, or ratio of head-width to head-length, is 77.3. They are said to be intelligent, industrious, and hospitable, and are one of the most civilized races of Central Africa. They engage in agriculture, cattle-raising, and commerce, and make good artisans. They form a large part of the military forces of Great Britain in Nigeria, and also of the Congo Free State. For the most part they have adopted Mohammedanism from their conquerors, the Fulahs. The Hausa language has become that of trade over a large region to the westward and northward to the Barbary States. It represents an isolated branch of the Hamitic family of languages. An association for its study was formed in London in 1892, and a professorship has been established at Cambridge. Another race found in the region is the Tuculör. The Hausa Empire is supposed to have been very powerful about the middle of the fifteenth century. It gradually became divided up into States, some of which represented the highest civilization of the Sudan. The Fulahs entered the country gradually, and in the early part of the nineteenth century made themselves masters of the whole region. Consult: Robinson, *Hausaland* (London, 1896); *Hausa Literature* (Cambridge, 1896); *Hausa Grammar* (London, 1897); Robinson and Brooks, *Hausa Dictionary* (Cambridge, 1899-1900). There are also grammars by Schoen (London, 1862) and Marre (Vienna, 1901).

HAUSEGGER, hou'zĕg-ẽr, FRIEDRICH VON (1837—). An Austrian writer on musical theory, born at Vienna. He studied music with Salzmann and Otto Dessoff, and, after practicing law for some time at Gratz, became in 1872 a teacher of music at the university there. His most important book is *Musik als Ausdruck* (1885), and *Richard Wagner und Schopenhauer* (1892) and *Vom Jenseits des Künstlers* (1893) are also valuable.

HAUSER, houz'ẽr, FRANZ (1794-1870). A Bohemian opera singer, born at Prague. He was a pupil of Tomaschek, and had a remarkable barytone voice. From 1817 to 1837 he sang with great success in Prague, Dresden, Vienna, London, Berlin, etc., and from 1846 to 1864 was director and singing teacher at the Munich Conservatory. He had a splendid collection of Bach's works, and his correspondence with Hauptmann and Mendelssohn is interesting. He died at Freiburg, Baden.

HAUSER, MISKA (1822-87). An Hungarian violinist, born at Pressburg. He was a pupil of Kreutzer and Joseph Matalay, and of the Vienna Conservatory. He made successful concert tours of Europe, America, Australia, and India, and composed a good deal of violin music. He published *Aus dem Wanderbuch eines österreichischen Virtuosen* (1858-59), which was an account of his American trip. He died at Vienna.

HAUSRATH, hous′rät, ADOLF (1837—). A German Protestant theologian, born at Karlsruhe. He was educated at Jena, Göttingen, Berlin, and Heidelberg, and was appointed professor of ecclesiastical history at Heidelberg in 1867. His publications include: *Der Apostel Paulus* (2d ed. 1872); *Neutestamentliche Zeitgeschichte* (3d ed. 1875-79); *D. F. Strauss und die Theologie seiner Zeit* (1876-78); *Arnold von Brescia* (1891); *Peter Abälard* (1893); *Martin Luthers Romfahrt* (1894); *Die Arnoldisten* (1895); *Karl Holsten* (1897); *Alexander und Luther auf dem Reichstage zu Worms* (1897); *Alte Bekannte* (1899-1901); and, under the name George Taylor, the historical novels *Antinous* (1880); *Klytia* (1883); *Jetta* (1884); *Elfriede* (1885); and *Peter Maternus* (1898); and the stories *Unter dem Katalpenbaum* (1899) and *Potamiana* (1901).

HAUSSA STATES. See HAUSA STATES.

HÄUSSER, hois′ēr, LUDWIG (1818-67). A German historian and politician, born at Kleeburg in Lower Alsace. He entered the University of Heidelberg as a student of philology, but under Schlosser's influence soon devoted himself to history, the study of which he continued at the University of Jena. After his graduation he taught for a number of years, spent some time in Paris, and in 1845 was appointed professor of history at Heidelberg. Soon afterwards he became interested in the political movements of the day and wrote a pamphlet on *Schleswig-Holstein, Deutschland und Dänemark* (1846). At the beginning of 1847 he was chosen an editor of the *Deutsche Zeitung,* and in November of the same year was elected to the Second Chamber of the Baden Legislature, where he supported the Federal Constitution. He took no part in the May Revolution of 1849, and the next year again became a member of the Legislature, but resigned in October, and devoted himself to his historical studies. His opposition in 1858 to the reaction in the Protestant Church was as successful as the polemic into which he entered in 1859 against the concordat with the Papacy. From 1860 to 1865 he was again a member of the Second Chamber, and supported the Liberal Ministry. He was one of the founders of the *Süddeutsche Zeitung,* and in December, 1863, took part in the assembly of representatives of the German States at Frankfort. Though Häusser was conspicuous in politics, his fame rests chiefly upon his historical works. He was a brilliant and inspiring lecturer. His chief work, *Deutsche Geschichte vom Tode Friedrichs des Grossen bis zur Gründung des Deutschen Bundes* (4 vols., 1854-57; 4th ed. 1869), is one of the most striking achievements of modern German historical research. Among his numerous other publications are *Geschichte des Zeitalters der Reformation* (1868; 2d ed. 1879) and *Geschichte der Französischen Revolution* (1867; 3d ed. 1891), which were issued after his death. Many of his lectures, edited from stenographic reports, have also been published.

HAUSSEZ, ō′sā′, CHARLES LEMERCIER DE LONGPRÉ, Baron d' (1778-1859). A French politician, born at Neufchâtel, of an aristocratic family. At sixteen he began to take a part in conspiracies against the Directory and the Consulate, and was an enthusiastic supporter of the Empire, but joined the Royalist Party on the return of the Bourbons. In 1829 he became Naval and Colonial Minister, and in the following year was forced to flee to England because of his loyalty to Charles X. He was condemned to perpetual imprisonment; but in 1839, after extensive travels in Italy, Switzerland, and Germany, benefited by the amnesty to return to France. Among Haussez's works the following may be mentioned: *Réflexions d'un ami du roi* (1816); *La Grande Bretagne en 1833* (1833); *Voyage d'un exilé* (1835); *Alpes et Danube* (1837); and *Etudes morales et politiques* (1844 and 1851). From his political memoirs excerpts were published in the *Revue de Paris* (1894).

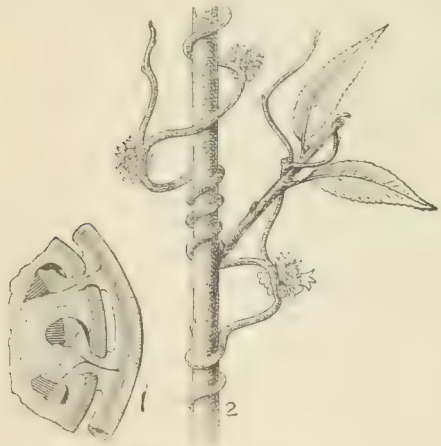
HAUSSMANN, ōs′män′, GEORGES EUGÈNE, Baron (1809-91). A French official under the Second Empire. He was born in Paris, and was educated at the Conservatory of Music, but became an advocate. After the Revolution of 1830 he was sous-préfet successively of Nérac, Saint-Girons, and Blaye, and under the Presidency of Louis Napoleon was prefect of Var, the Yonne, and Gironde. He was appointed Prefect of the Seine in 1853. While holding this office, Haussmann expended some $500,000,000 in rebuilding and beautifying Paris. Parks were planted on the sites of hovels; splendid boulevards were run through the city; squares were laid out; statues, bridges, and magnificent public buildings sprang up with almost miraculous rapidity. In carrying on his work Haussmann let no considerations of private rights or financial expediency stand in the way. His enemies accused him of systematic peculation, and declared that his broad boulevards were intended for the rapid mustering of troops and cannon in case of any uprising against the Empire. A stinging pamphlet by Jules Ferry, and the enmity of Ollivier, who became Minister in 1870, brought about Haussmann's downfall. His work, however, had done much to make the Second Empire popular. In 1857 he was made a Senator, and elected a member of the Academy of Fine Arts. He was likewise a member of the Imperial Council of Public Instruction. After the fall of the Empire he quitted France for a time. On his return he was appointed director of the Crédit Mobilier, and did much to improve the condition of that financial institution. In 1877 he was returned to the Chamber of Deputies by the Arrondissement of Ajaccio, in Corsica.

HAUSSONVILLE, ō′sôn′vēl′, GABRIEL PAUL OTHENIN DE CLÉRON, Count d' (1843—). A French author and politician, born at Gurcy-le-Châtel. Elected a Deputy in 1871, he voted with the Right Centre. He failed of reëlection in 1876, because of his lack of loyalty to the Republic, and in 1877 retired to private life and literary labors. He was elected to the French Academy in 1888, and in 1891 became the spokesman of the Orleanist dynasty. Haussonville's more important works are: *Les établissements pénitentiaires en France et aux colonies* (1875); *Sainte-Beuve* (1875); *L'enfance à Paris* (1879); *Le salon de Mme. Necker* (1882); *Etudes biographiques et littéraires* (1879-81); *Mme. de La Fayette* (1891); *Socialisme et charité* (1895); *Lacordaire* (1896); and *La duchesse de Bourgogne et l'alliance savoyarde* (1898-1901).

HAUSSONVILLE, JOSEPH OTHENIN BERNARD DE CLÉRON, Count d' (1809-84). A French

statesman and author, born in Paris. He was secretary to the Embassy at Brussels, then at Turin, then at Naples, and from 1842 to 1848 represented Provins in the Chamber of Deputies. He was not a great speaker, but was an active member of the Conservative Party until the Revolution of 1848, when he retired and devoted himself to literature. His most important works are: *Histoire de la politique extérieure du gouvernement français de 1830 à 1848* (1850); *Histoire de la réunion de la Lorraine à la France* (1854-59); and *L'Eglise romaine et le premier Empire* (1864-69), the work which gained him admission to the Academy in 1869. During the Franco-German War he wrote political letters valuable for their opportuneness more than for their literary style, notably, *La France et la Prusse devant l'Europe*. After the peace he became the protector of exiles from Alsace and Lorraine who wished to continue under French rule. His wife, Louise de Broglie, was also a writer, and the Count supported her brother, the Duke, in politics, against M. Thiers. He became Senator for life in 1878.

HAUSTO'RIA (Neo-Lat. nom. pl., from *haustor*, drawer, from *haurire*, to draw). A term applied to special structures which are found in a variety of plants, and whose function is that of attachment and suction. Some of the best illustrations of such outgrowths are found among parasitic fungi, in which the filaments have the general habit of putting forth processes that penetrate the cells of their hosts. In the interior of the host cell the haustorium usually enlarges, and through the greatly increased surface it is able rapidly to absorb nourishment for the fungus. Such haustoria generally cause the death of the host cells. Haustoria of a far more complicated structure are found in higher plants, as the dodder (*Cuscuta*), and such parasites as the beech-drop and broom-rape (*Orobanchaceæ*), which live on the roots of certain trees. In these groups the haustoria are probably really ad-



HAUSTORIA OF DODDER
1. Haustorium enlarged. 2. Dodder-vine, showing positions of haustoria.

ventitious roots, but the structure becomes greatly modified. They penetrate the tissue of the host and establish a direct connection with the conducting vascular bundles, so that the parasite actually taps the sources of food-supply, water, and organized food material, and draws off what it needs.

HAUTBOIS, hō'boi. See OBOE.

HAUTEFEUILLE, ōt'fē'y'. PAUL GABRIEL (1836—). A French mineralogist and chemist, born at Etampes, and educated at the Ecole Centrale, in which he taught metallurgy, and was director of the chemical laboratory until 1885. In that year he became professor of mineralogy in the University of Paris. His written work appeared mostly in technical journals, especially in the *Comptes Rendus* of the French Academy of Sciences, and he also published: *Recherches sur l'ozone* (1884), as well as a biographical memoir, *Henri Sainte Claire Deville* (1885, with Chappuis).

HAUTE-GARONNE, ōt'gà'rŭn'. A department in the south of France, bounded on the south by the Pyrénées, and on the west by the departments of Hautes-Pyrénées and Gers (Map: France, H 8). Area, 2219 square miles; population, in 1896, 459,377; in 1901, 448,481. It is watered by the Garonne, from which it derives its name, and within the basin of which it wholly lies. The soil in the valleys is very productive, and yields heavy crops of grain, maize, beans, etc. Orchard-fruits, with melons and tobacco, are produced in abundance, and the annual yield of wine is large. Rick salt is produced, and fine marble is obtained at Saint Beat. The chief manufactures are woolen and cotton fabrics and hardware. The Department of Haute-Garonne was formerly divided between the provinces of Languedoc and Gascony. It is divided into the four arrondissements of Toulouse, Muret, Saint Gaudens, and Villefranche. Capital, Toulouse.

HAUTE-LOIRE, ōt'lwär'. A southeast department of France, formed mainly from portions of Auvergne and Languedoc (Map: France, K 6). Area, 1916 square miles. The surface is mountainous, covered by the Cévennes, the Cantal Mountains, and the Margeride chain, with wooded slopes. The chief rivers are the Loire and the Allier. The soil of the plains is fertile, and the agricultural produce, consisting of the usual crops, with fruits, is abundant. Iron, coal, copper, lead, and other minerals are found, and there are important manufactures of silk and lace. Capital, Le Puy. Population, in 1896, 316,699; in 1901, 314,580.

HAUTE-MARNE, ōt'märn'. A department in the northeast of France, southeast of the Department of Marne (Map: France, M 3). Area, 1402 square miles. The surface is generally hilly and mountainous in the south and east; about one-fourth is in forest. The principal rivers are the Marne, with its tributaries, and the Meuse. Oats and wheat are largely cultivated, and wines are produced in several parts—Aubigny, Montsaugeon, etc. The department is rich in iron ore, and there are numerous furnaces, the production of iron being the principal branch of industry. Capital, Chaumont. Population, in 1890, 232,057; in 1901, 226,545.

HAUTERIVE, ō't'rēv'. ALEXANDRE MAURICE BLANC DE LANAUTTE, Count d' (1754-1830). A French diplomat and politician, born at Aspres, and educated at Grenoble and Tours. In 1792 he was made consul at New York. A false accusation lost him this post, and he was forced to

live as a farmer in America until 1798, when he was recalled and appointed chief of the first division of political correspondence in the Ministry of Foreign Affairs. His brochure, *De l'état de la France à la fin de l'an VII.*, undertaken at the order of Bonaparte, won him a high place under the Consulate and Empire, and he frequently served as Minister of Foreign Affairs in the absence of Talleyrand. But his policy of an Austrian alliance clashed with his chief's demand for a Prussian alliance, and he was transferred to the post of director of archives. In his later years he interested himself in archæology, wrote on Egyptian antiquities, and was elected to the Society of Inscriptions (1820).

HAUTES-ALPES, ôt'zâlp'. A southeastern department of France, adjoining the Italian frontier, formerly part of the ancient Province of Dauphiné (Map: France, N 7). Area, 2158 square miles; population, in 1896, 113,229; in 1901, 109,510. It is traversed by the Cottian Alps, which reach their maximum altitude in the department in Les Ecrins, 13,460 feet in elevation. The chief river is the Durance, noted for the picturesque scenery along its course. Marble is quarried and anthracite coal and argentiferous lead are mined. Mountain pasturage for sheep is its chief agricultural branch. Capital, Gap.

HAUTE-SAÔNE, ôt'sôn'. A northeastern department of France, bounded on the north by the Department of Vosges, and on the east by Belfort. Area, 2062 square miles. It is traversed from north to south by the Saône River, from which it derives its name. About one-half of the entire area is cultivable land; more than a fourth, comprising the north and northeast districts, is covered with forest-clad mountains. In the south and southwest are fertile plains, bounded by hills, covered with vines or timber. Fruits and tobacco are largely cultivated. Sheep, including some flocks of the merino breed, and cattle are raised in large numbers. Coal, copper, manganese, and iron are found. Capital, Vesoul. Population, in 1896, 272,891; in 1901, 266,605.

HAUTE-SAVOIE, ôt'sâ'vwä'. An eastern department of France, bordering on Switzerland and Italy, formerly part of Savoy. Area, 1667 square miles. The summit of Mont Blanc is situated in this department; about one-fourth of the surface is forested. The Rhône is the principal river. In the north, south, and west, wheat, oats, and fruit are cultivated, but the chief agricultural industry is pastoral. Capital, Annecy. Population, in 1896, 262,142; in 1901, 263,803.

HAUTES-PYRÉNÉES, ôt'pê'râ'nâ'. A southern department of France, part of the old Province of Gascony lying east of the Basses-Pyrénées. Area, 1749 square miles. As its name implies, it contains some of the loftiest summits of the Pyrenean chain. The aspect of the scenery is varied, mountains and precipitous rocks in the south, an agreeable diversification of hill and dale in the centre, with fertile plains in the north. The principal rivers, none of which, however, are navigable in the department, are the Adour and the Gave de Pau. The well-cultivated and artificially watered lowlands yield good crops of cereals, leguminous plants, flax, and fruit of every kind, including the grape, from which excellent wine and brandy are made. Horses, mules, cattle, sheep, swine, and poultry are raised. This department—which is the richest part of the Pyrénées in mineral products, especially marble, copper, iron, zinc, lead, antimony, slate, and granite—contains also the celebrated sulphur springs of Saint-Sauveur, and the hot baths of Bagnères, Barèges, and Cauterets. Capital, Tarbes. Population, in 1893, 218,973; in 1901, 215,546.

HAUTE-VIENNE, ôt'vyĕn'. A west central department of France, formed mainly from portions of the old Limousin and Marche. Area, 2130 square miles. It is traversed by the Monts du Limousin, ranges of low hills, well wooded, and intersected by fertile valleys. The Vienne River crosses the department from east to west. Rye, wheat, and other cereals are cultivated in the valleys; cattle are raised on the extensive meadow lands, and chestnuts are grown for local consumption and export; the soil generally, however, is stony, and agriculture is in a backward condition. Mines of iron, lead, copper, and antimony are worked; granite and building-stone are quarried, and in the south, near Saint-Yrieix, there are valuable deposits of kaolin, from which the porcelain factories of Sèvres and Limoges draw in part their supplies. Capital, Limoges. Population, in 1896, 375,724; in 1901, 381,753.

HAUTLEIN, ô'tlăn', MARQUIS DE. The courtly French nobleman at whose castle Sir Walter Scott professes to have gathered the materials for his novel *Quentin Durward.*

HAUT-RHIN, ô'răn'. A former department of France. See BELFORT, TERRITORY OF.

HAÜY, â'wê', RENÉ JUST (1743-1822). A French mineralogist, born in Saint-Just, France. He was educated for the Church, and took priest's orders. While engaged in teaching in Paris, he acquired a fondness for botany, but, subsequently, hearing Daubenton lecture on mineralogy, he developed an interest in that science. The accidental dropping of a crystal of calcite revealed to him the geometric law of crystallization, on which subject he published more than a hundred papers. During the Revolution he was thrown into prison, but was released through the influence of Geoffroy Saint-Hilaire. In 1793 he was appointed on the Commission of Weights and Measures, and in 1794 became keeper of the Cabinet of Mines. Subsequently, in 1802, he became professor of mineralogy in the Museum of Natural History in Paris, where his magnificent collection of crystals is still preserved. Besides being an honorary canon of Notre Dame, he was a member of the French Academy, and of other scientific societies. Abbé Haüy's principal works are: *Traité de mineralogie* (1801), in which he contended that the crystalline form should be the principal element in the determination of a mineral; *Traité élémentaire de physique* (1803); *Traité des caractères physiques des pierres precieuses* (1817); *Traité de crystallographie* (1882).

HAÜY, VALENTIN (1745-1822). A French abbé, brother of the preceding, who invented methods for teaching the blind. He was born in Saint-Just, and it is said that his interest in a pianiste stricken with blindness first stimulated his search for a means to alleviate the

affliction. This means he first discovered in the printing of raised maps and letters. He started schools for the purpose of giving manual, mathematical, and musical training to the blind, but his zeal outran his discretion, and others excelled him in the carrying out of his ideas. During the ascendency of Napoleon, he lived in Saint Petersburg for more than ten years, working there for the blind. He was twice married, though a priest. His publications include *L'éducation des aveugles* (1786), and *Mémoire historique sur les télégraphes* (1810). Consult: Strebitzky, *Valentin Hauy à Saint Pétersbourg* (Paris, 1884).

HAÜYNITE, ä'wē-nit, or **HAÜYNE**, ä'wēn. A sodium, calcium, aluminum silicate and sulphite that crystallizes in the isometric system, has a vitreous lustre, and is blue, green, red, and yellow in color. It is found chiefly in igneous rocks, usually in association with nephelite and lucite, occurring especially in volcanic regions, such as in the lavas of Vesuvius, on Mount Somma, and elsewhere in Italy; also in the Azores, Canary, and Cape Verde Islands, and in the United States it is found in Montana. The mineral is named after the famous French mineralogist Haüy.

HAVANA, hä-vä'nä *or* hä-văn'ä (Sp. *La Habana*). The capital of Cuba and the largest city in the West Indies, situated on the northern coast of the island, in latitude 23° 8′ N., and longitude 82° 22′ W. (Map: Cuba, C 3). It lies on a peninsula bounded by the Gulf of Mexico and the Bay of Havana. The latter is regarded as one of the safest harbors of the world, while its depth is sufficient for vessels of the greatest draught; its narrow entrance is protected by the Punta Castle on the west and Morro Castle and La Cabaña on the east. Havana comprises an area of about nine square miles, and is surrounded by a sea wall on the west. The older portion of the city, which was formerly surrounded by a wall begun in 1633 and demolished in 1863-80, has all the shortcomings of the old colonial town. Its streets are narrow and crooked, and up to the time of the American occupation were in a state of the utmost neglect. Beyond the limits of the old city, however, Havana is essentially modern. The well laid out and broad streets, the abundance of promenades, and picturesque plazas would do credit to any city on the Continent. The houses are generally low and built in the Spanish style, which, however, is relieved by the bright coloring of the walls and roofs. The atmosphere, also, is generally bright and clear, as there are very few days wholly clouded, the rain generally falling in the afternoon. The climate, though tropical, is tempered by alternating land and sea breezes. The mean temperature is 78° for the warmest, and 70° for the coolest month, the extremes being 50° and 90°. The humidity, however, is above 80 per cent. at all seasons.

In the old city, and near the inner entrance to the harbor, is the Plaza de Armas, fronting which on the west stands the former Governor's palace, while the next block behind is occupied by the university. To the north of this plaza is La Fuerza, the oldest structure in the city, built as a defense in 1538 by Hernando de Soto. Beginning at the Castillo de la Punta at the outer harbor entrance, and running outside the old city wall, is the Prado, a wide and beautiful boulevard with a double row of shade-trees along the middle. It terminates in the Colón Park, or Campo Marte, the largest in the city, planted with trees and palms, and having a fountain in the centre. Running west from Colón Park is the Calle de La Reina, which is continued as the Paseo de Tacón, a splendid drive passing the Botanical Gardens and terminating at the citadel of El Príncipe outside of the city. At the eastern entrance stands a fine statue by Canova of Charles III., and from its western end a road leads to the Colón Cemetery with a magnificent entrance of three granite arches, and containing numerous fine monuments, among which the firemen's monument, made entirely of marble, and erected to the memory of thirty firemen who perished in the performance of their duty, is a magnificent piece of monumental sculpture. Other notable promenades are the Alameda de Paula and the Calzada de La Infanta, a fine boulevard skirting the city on the west.

The public buildings of the capital are not far behind its natural embellishments; the Governor's palace and the cathedral dating from 1724, which contained, until 1898, the remains of Columbus, are among the most prominent. The educational institutions include the University of Havana with five faculties, founded by the Dominicans in 1670; the Jesuit College de Belén, a museum and library, and a number of minor schools. The theatres are numerous, and one of them, the Teatro Tacón, is one of the largest playhouses in the world. There are numerous hotels and clubs in the city; and the newspapers and periodicals number over a hundred, the leading ones being: *La Lucha, El Diario, La Discusión,* and *El Nuevo Pais.* Barring the water-supply, which is excellent, the public works of Havana are utterly inadequate. At the end of the Spanish-American War the American authorities found the city in a woefully unsanitary condition. The streets were unswept, garbage was piled in heaps, and the pavements were in a miserable condition, especially in the old city. The sewerage system was hardly more than a name. The existing sewers were in some places completely clogged, and all of them leaked, contaminating the surrounding soil. In 1902, however, the city was handed over to the new Republic in a wonderfully improved condition. A well-regulated system of street-cleaning and garbage collection had been put in operation. Many of the streets had been repaved and various kinds of experimental pavements were laid. Contracts had been let for a new sewer system, and a complete survey of the city, with a view to adopting a system of street grades, had been made. Streets, hospitals, and other buildings had been so thoroughly disinfected that yellow fever, which during the recent war carried off many thousands of people, has now been almost, if not wholly, eradicated.

The chief industrial establishments of Havana are its cigar and tobacco factories, which are the largest in the world. The exports consist chiefly of cigars, tobacco, and sugar, which mostly find their way to the United States. Havana is the chief outlet for the products of the island. It is connected by steamers with the United States, France, England, and Spain, and by rail with every important centre on the island. The imports consist chiefly of foodstuffs and cotton

Since the evacuation of the island by Spain, the commerce of Havana has shown a considerable increase. The total value of the foreign commerce for 1900 was about $75,000,000, of which about $50,000,000 represented imports. The total commerce with the United States in the same year amounted to about $32,000,000. During the same year 3276 vessels, with a total tonnage of 2,078,126, entered the port, and 3226, with a tonnage of 2,079,802, cleared. The extensive commerce of Havana is greatly facilitated by the numerous financial institutions situated in the city. The population of Havana, including its suburbs, was 242,055 in 1899, against 200,448 in 1887. The foreign born at the last census numbered 52,900, or about 22.5 per cent. of the total population.

The Bay of Havana was discovered in 1508 by Sebastian de Ocampo. The city itself was originally founded in 1515 on the south coast, by Diego de Velasquez, but in 1519 it was transferred to its present site. It was sacked and burned by pirates in 1528; was plundered by another band in 1555, having by that time become Spain's chief naval station in the New World; and was again despoiled in 1563. It was unsuccessfully attacked by Drake in 1585, after which the forts Morro and de la Punta were built. During the seventeenth century it was several times attacked and blockaded by Dutch fleets, while pirates were continually hovering around, on the watch for unprotected galleons. During the eighteenth century the city was several times threatened by the English, who took Morro Castle by assault in 1762 and captured the city, remaining in control for a year. The United States battle-ship *Maine* was blown up in the harbor on February 15, 1898. In that year the city and harbor were blockaded by the American fleet during the war with Spain. For a good description of Havana, see Norton, *Complete Handbook of Havana and Cuba* (Chicago, 1900).

HAVANA. A province of Cuba. See LA HABANA.

HAVANA. A city and the county-seat of Mason County, Ill., 40 miles southwest of Peoria, on the Illinois River, and on the Illinois Central and the Chicago, Peoria and Saint Louis railroads (Map: Illinois, B 3). It has manufactures of drills, gasoline engines, farm implements, flour, etc., and a considerable trade in fish, agricultural produce, grain, and fruit. The city owns its water-works. Population, in 1890, 2525; in 1900, 3268.

HAVARD, à'vär', HENRY (1838—). A French art critic, born at Charolles. He left France because of his part in the Commune, but returned after the amnesty. His stay in Italy, Belgium, and Holland during his exile did much to influence his choice of art criticism as a vocation. In 1887 he was appointed inspector-general of fine arts. Among his more important works, after the early critiques in the *Siècle*, are: *Les merveilles de l'art hollandais* (1873); *Objets d'art et de curiosité tirés des grands collections hollandaises* (1873); *Les quatre derniers siècles* (1874); *La Hollande pittoresque* (1874-78); *Amsterdam et Venise* (1876); *L'art et les artistes hollandais* (1879-81); *Histoire de la peinture hollandaise* (1881); *La Hollande à vol d'oiseau* (1880); *La Flandre à vol d'oiseau* (1882); *L'art dans la maison* (1884); the valuable *Dictionnaire de l'ameublement et de la decoration* (1887-90); with Vachon, *Les manufactures nationales* (1888); *Van der Meer de Delft* (1889); *Les Boulle* (1893); *L'orfèverie* (1896); *Les arts de l'ameublement* (1897); and *Histoire et philosophie des styles* (1899-1900).

HAVAS (à'và') **AGENCY.** An organization in Paris, founded by a rich merchant, Charles Havas, in the reign of Louis Philippe, for the purpose of gathering telegraphic news and supplying it to newspapers. It was in 1879 converted into a company.

HAVASUPI, hä'và-sōō'pê. A small but interesting tribe of Yuman linguistic stock in the Coconino Cañon, northwestern Arizona. Although numbering only 250, their isolation has enabled them to preserve their primitive characteristics to a remarkable degree. Living as they do in the bottom of a cañon, isolated from the outside world by great perpendicular barriers of rock, the Havasupi Indians are perhaps nearer to the original estate than any other tribe in the Southwest. They are agriculturists and entirely self-supporting, having always possessed three years' provisions stored away in stone-built granaries in the clefts of the mountain walls. The women are expert basket-makers. To the Spaniards they were known as Cojonino.

HAVEL, hä'vel. A river of Northern Germany, and a considerable tributary of the Elbe. It has its origin in a small lake a mile west of the town of Neustrelitz, in Mecklenburg (Map: Germany, E 2). It flows southward from its source to Potsdam, and thence west and northwest to its junction with the Elbe, opposite the town of Werben. Its entire length is 220 miles, and it is navigable to Fürstenberg, a town within 30 miles of its source. The Havel, forming for a considerable part of its course the connecting link to a long chain of lakes, is of great importance to the internal trade of Prussia, and serves as a feeder to numerous canals. Of its affluents, the Spree, which is longer than the Havel, is the only one worthy of mention.

HAVELOCK, hăv'ê-lŏk, Sir HENRY (1795-1857). An English soldier. He was born April 5, 1795, at Bishop-Wearmouth, Durham, where his father was a merchant and a ship-builder. He was educated at the Charterhouse and studied law at the Middle Temple, but abandoned the profession. He entered the army soon after the battle of Waterloo, went to India in 1823, and distinguished himself in the Afghan and Sikh wars. In 1856 he commanded a division of the army that invaded Persia. News arriving of the Indian Mutiny, in 1857, he hastened to Calcutta. He was directed to organize a small movable column at Allahabad, and to push on to the relief of Cawnpore and Lucknow. By forced marches and three sanguinary victories he reached Cawnpore, and found the mutilated bodies of the English women and children who had been massacred upon his approach. An avenging column quitted Cawnpore to advance upon Lucknow. After eight victorious battles with the rebels, Havelock's little army, thinned by fatigue and sickness, was obliged to retire upon Cawnpore. Early in September, 1857, General Outram arrived with reënforcements: Havelock again advanced to the relief of Lucknow, Outram chivalrously refusing to take the com-

mand out of his hands. After desperate fighting at Mungulwar, at the Alam Bagh, and through the streets of Lucknow, they gained the Residency, to the joy of the beleaguered garrison, but were in turn besieged. They held their own until Sir Colin Campbell (later Lord Clyde) forced his way to their rescue on November 19th. Havelock, unfortunately attacked by dysentery, died five days after the relief, on November 24, 1857. His services had won him the distinction of K. C. B., and other honors, including a baronetcy, were conferred upon him before the news of his death reached England. The rank and the pension were given to his widow. For his biography, consult: Brock (London, 1858); Marshman (London, 1860); Forbes (London, 1890).

HAV'ELOCK-AL'LAN, Sir Henry Marshman (1830-97). An English soldier, the son of Sir Henry Havelock, the reliever of Lucknow. He was born at Chinsurah, India, and was educated at a private school in London. In 1846 he was commissioned an ensign in the Thirty-ninth Foot. He was a lieutenant in 1848 and an adjutant in 1852. In 1857 he saw active service in Sir James Outram's Persian campaign. After the outbreak of the Indian Mutiny he accompanied his father to Calcutta, and served on his staff in his victorious march to the relief of Cawnpore and Lucknow. At Cawnpore, on July 16, 1857, his gallantry and daring in leading a charge for the capture of a gun won for him the Victoria Cross. In the advance from Cawnpore to Lucknow he was severely wounded. In January, 1858, the baronetcy and pension which it had been proposed to bestow upon his father were conferred upon him. He served until the suppression of the mutiny, received brevets of major and lieutenant-colonel, and commanded Hodson's Horse in Lord Clyde's last campaign. He served in New Zealand under Sir Duncan Campbell in the Maori War of 1863-64, and as assistant quartermaster-general in Canada in 1867-69. On leave of absence, and as a newspaper correspondent, he saw the Franco-German War of 1870-71, and the Russo-Turkish War of 1877-78. He was a member of Parliament as a Liberal, 1874-81, and later as a Liberal-Unionist, 1885-92, and from 1895 until his death. He took an active part in the debates, and held the position of chairman of the Naval and Military Service Committee. In the latter capacity, during the Parliamentary recess of 1897, he visited India to study the needs of the Indian Army, and visited the Afghan frontier, where a campaign against the hill tribes was in progress. Here, on December 30, 1897, while accompanying the troops near Ali Masjid, an unmanageable horse carried him beyond the lines, and he was fired upon and killed by some Khaibaris who were harassing the British flank. He took the additional surname of Allan in 1880, and retired from the active list of the Army in 1881 with the rank of lieutenant-general. He wrote *Three Main Military Questions of the Day* (1867). Consult: Kaye, *History of the Sepoy War* (London, 1864-75); Malleson, *History of the Indian Mutiny* (ib., 1878-80); Marshman, *Life of Sir Henry Havelock* (ib., 1870).

HAVELOCK THE DANE, The Lay of. An Anglo-Danish legend of early England. Gaimar, an Anglo-Norman chronicler of the twelfth century, speaks of it as an ancient story. The earliest form is a French version, *Le Lai de Aveloc*, abridged by Gaimar. The old French and an English version of the later thirteenth century were published by Sir F. Madden for the Roxburgh Club (1828), and *The Lay of Havelock the Dane* was edited by W. W. Skeat in the Early English Text Series (1868). The Danish prince, Havelock, was rescued by Grim, a fisherman, who became his foster-father. When Havelock gained the English crown, he rewarded Grim, who built the town of Grimsby.

HAVEMANN, hä've-mân, Wilhelm (1800-69). A German historian, born in Lüneburg, Hanover. He studied law in the universities of Göttingen and Erlangen. In 1825 he was arrested for his alleged revolutionary activity, and was sentenced to five years' imprisonment. After his release he taught in various schools until 1838, when he became a professor in the University of Göttingen, where he was admitted to the Gesellschaft der Wissenschaften (1850). His most important work is the *Geschichte der Lande Braunschweig und Lüneburg* (rev. ed. 1853-57).

HAVEMEYER, hăv'e-mī'ēr, William Frederick (1804-74). An American politician. He was born in New York City, of German parentage, was educated at Columbia, and went into business with his father. In 1842 he retired from business with a good fortune, and devoted himself to politics. He was an enthusiastic Democrat, and was elected Mayor of New York in 1845 and in 1848 by large majorities, and for a third time in 1872, but by a narrow margin. His first two terms were marked by the thorough care he bestowed on even the smallest details of his office and the honesty and economy he exacted. His third administration was less felicitous than the others in his appointments, and contentions with the aldermen monopolized the greater part of his time. An appeal was made to the Governor for his removal, but was not acted upon. He was president of the Bank of North America from 1851 to 1861, and brought it successfully through the crisis of 1857. His fearlessness and political experience were of the greatest value in the overthrow of the Tweed 'ring.'

HA'VEN, Alice Bradley (1828-63). An American author. Her maiden name was Emily Bradley, and she was born at Hudson, N. Y. Her first writing appeared in the Philadelphia *Saturday Gazette*, to whose editor, Joseph C. Neal, she was married in 1846. She continued her writing under the name of 'Cousin Alice,' and although after her husband's death in 1847 she took editorial charge of the paper, she still found time to contribute many poems and short stories to other periodicals. In 1853 she married Samuel L. Haven. Her works include: *The Gossips of Rivertown* (1850); *Contentment Better than Wealth; All's Not Gold that Glitters;* and *Out of Debt, Out of Danger*.

HAVEN, Erastus Otis (1820-81). An American educator and Methodist Episcopal bishop. He was born in Boston, graduated at Wesleyan University in 1842, and after a short period of teaching in preparatory schools entered the Methodist ministry. In 1853 he was chosen professor of Latin in Michigan University, and three years later became editor of *Zion's Herald*, in Boston. He was twice elected to the Massachusetts Senate, where he distinguished him-

self by his intense interest in educational matters. In 1863 he accepted the presidency of Michigan University, and six years later became president of Northwestern University. He later held the position of corresponding secretary of the Methodist Episcopal Board of Education, but resigned in 1874 to become chancellor of Syracuse University. In May, 1880, he was ordained a bishop. Among his works are: *The Young Men Advised* (1855); *Pillars of Truth* (1866); and a treatise on *Rhetoric* (1869).

HAVEN, Gilbert (1821-80). An American clergyman, bishop of the Methodist Episcopal Church. He was born at Malden, Mass.; graduated at Wesleyan University in 1846, taught for several years, and in 1851 joined the New England Conference. He was for a short time chaplain of a Massachusetts regiment in the Civil War. In 1862 he traveled in Europe for his health, and on his return was two years a preacher in Boston. In 1867 he became editor of *Zion's Herald*, holding the place until elected bishop in 1872. For some years he had manifested great interest in the welfare of negroes, especially in the Southern States, and had supervision of relief for destitute freedmen in Mississippi. As bishop he was stationed at Atlanta, Ga., with special charge of the interests of his Church in the South. He was an earnest advocate of Protestant missions in Mexico, and described his missionary journey to that country in *Our Next-Door Neighbor* (1875). Among his other writings were: *The Pilgrim's Wallet* (1865); *Life of Father Taylor, the Sailor Preacher* (1871); and *Christus Consolator* (1893), edited by his son.

HAVEN, Joseph (1816-74). An American Congregational clergyman. He was born in Dennis, Mass.; graduated at Amherst in 1835, and studied theology at the Union Theological Seminary and at Andover. He held pastorates at Ashland and Brookline, Mass., from 1846 to 1850, and also edited the *Congregationalist*. He was professor of mental and moral philosophy at Amherst (1850-58), and from 1858 until 1870 was professor of systematic theology at the Chicago Theological Seminary. Besides text-books on mental and moral philosophy, he published: *Studies in Philosophy and Theology* (1869), and *Systematic Divinity* (1875).

HAVERCAMP, hä'vĕr-kämp, Siegebert (1684-1742). A Dutch numismatist and scholar, born and educated at Utrecht. He was long a preacher and an instructor in Greek at Leyden, and was appointed professor of Greek and later of history in the same university. He edited Josephus (1726), Lucretius (1725), and other works; wrote on the history of Holland (1739), and a universal history to the time of Charlemagne (1736-39); but is best known for his numismatical writings, *De Numismate Alexandri Magni* (1722); *Thesaurus Morellianus* (1734); and *Nummophylasium Reginæ Christinæ* (1742).

HAV'ERFORD COLLEGE. An educational institution situated at Haverford, Pa. It was opened in 1833 as a school designed to afford literary instruction and religious training to the children of Friends, under whose control the present college continues. Systematic physical training and athletic sports were made prominent in the original plan, and are still insisted upon. The school was temporarily suspended in 1845, in order to give opportunity for collecting an endowment, and was reorganized as a college in 1856. In 1902 the faculty numbered 20 and the student body 125. At the same time the library contained 40,000 volumes. The college grounds, occupying 225 acres, are valued at $400,000, the buildings are valued at $300,000, while the endowments represent $1,000,000. The degrees of B.A., B.S., M.A., and M.S. are conferred.

HAVERFORDWEST, hăv'ĕr-fôrd-wĕst' *or* här'fĕrd- (Welsh *Hwlffordd*). A seaport, market-town, and municipal county, the capital of Pembrokeshire, Wales, on Saint George's Channel, 8 miles northeast of Milford (Map: England, A 5). It has coal-mines and a paper-mill. A thriving trade exists, exporting coal, cattle, and agricultural produce, and importing timber, spirits, tea, etc. Its port admits vessels of 100 tons. It has an interesting old church, the remains of a castle built about 1140, and of a twelfth-century priory endowed by Robert de Hwlffordd. The town was colonized with Flemings by Henry I. in 1107, and has a long roll of charters embodying peculiar privileges. It owns its gas and waterworks, markets, and slaughter-houses. Population, in 1901, 6000.

HAV'ERGAL, Frances Ridley (1836-79). An English religious writer. She was born at Astley, England, where her father, William Henry Havergal (q.v.), was rector. She was educated partly at home and partly at Düsseldorf, Germany. She early developed considerable musical talent, and wrote hymns for which she furnished the harmonies. These gradually found their way into print; their popularity induced editors of religious magazines to seek her out, and she became known almost against her will. Her devotional works, in both verse and prose, include: *The Ministry of Song* (1870); *Kept for the Master's Use* (1879); *Loyal Responses* (1878); *Coming to the King* (1886); and *Red-Letter Days* (1879). She is best known as author of the hymn "Take My Life and Let It Be." Her *Poetical Works* (2 vols., 1884), containing her hymns, her best work, were collected by her sister, who also published *Memorials of Frances Ridley Havergal* (London and New York, 2d ed. 1880).

HAVERGAL, William Henry (1793-1870). An English composer, born at Chipping Wycombe, Buckinghamshire, and educated at Oxford. He took orders; was curate under Biddulph at Saint James, Bristol, and Creech Heathfield (1816-20); and later curate at Coaley (1820-22), and at Astley (1822-26). In 1829 he received severe injuries in a carriage accident, and after that time did little preaching, but devoted himself more and more to music. He edited Ravenscript's *The Whole Booke of Psalms* (1844), and published a collection of his own compositions, *A Hundred Psalm and Hymn Tunes* (1859). Of his separate works the best known are the "Worcester Chant," the song "Summer Tide is Coming," and the psalm tune "Evan." Consult the biography by his daughter, Mrs. Crane (London, 1882).

HA'VERHILL. A city in Essex County, Mass., 33 miles north of Boston, at the head of navigation on the Merrimac River, and on the Boston and Maine Railroad (Map: Massachusetts, E 2). The city, which includes several villages, is handsomely built on hills sloping

to the river, and is connected by iron bridges with the towns of Groveland and West Newbury. Haverhill is noted as an industrial centre, particularly for the manufacture of boots and shoes. Other manufactures are slippers, woolen hats, paper, boot and shoe machinery and supplies, woolens, leather, boxes, and bricks. Among the principal buildings are the city hall, public library, Masonic Temple and other society halls, old ladies' home, children's home, Hale Hospital, city hospital, city almshouse, and Bradford Academy. There are also a marble soldiers' monument, and one to Hannah Dustan. Under the original city charter of 1870, the government is administered by a mayor, elected annually, and a bicameral council, which confirms the executive's appointments of police, fire, and health boards, and park, water, and license commissioners, and elects all other municipal officials, excepting the school board, which is chosen by the people. The annual income and expenditures of the city amount to about $1,170,000 and $1,145,000 respectively, the principal items of expense being $33,000 for the police department (including amounts for police courts, jails, etc.), $50,000 for the fire department, and $139,000 for schools. The city owns and operates its water-works. Population, in 1890, 27,412; in 1900, 37,175.

In 1640 a company from Ipswich and Newbury settled on the site of the old Indian town Pentucket, and in the following year adopted the name Haverhill (from Haverhill, England, the birthplace of their minister, John Ward). Being a frontier town, Haverhill was continually harassed by the Indians. In the attack of 1697 Mrs. Dustan was captured. (See DUSTAN, HANNAH.) In 1708 the French and Indians entered the town and killed 16 and captured 35 of the inhabitants. In 1645 a town charter was secured, and in 1870 Haverhill was incorporated as a city. The town of Bradford was annexed in 1897. In 1882 there was a disastrous fire. Lake Kenoza, one mile northeast, is famous as the birthplace of Whittier. Consult: Chase, *The History of Haverhill* (Haverhill, 1861); Frankle (editor), *The Story of a New England Town* (Boston, 1891).

HAVERHILL. A town, including several villages, and a county-seat of Grafton County, N. H., 85 miles north by west of Concord; on the Connecticut River, and on the Boston and Maine Railroad (Map: New Hampshire, F 5). It has extensive granite-quarrying and dairying interests, and manufactures lumber, farm wagons, house-finishings, stanchions, whetstones, etc. Population, in 1890, 2545; in 1900, 3414.

HA'VERS, CLOPTON (c.1650-1702). An English anatomist and physician. He studied at Cambridge and Utrecht, and from the latter college obtained the degree of M.D. in 1685. Havers began his medical practice in London, and gave special attention to the subject of anatomy, embodying his ideas in the *Osteologia Nova* (1691). This work was the first exhaustive treatise on the structure of the bone, and served to perpetuate the author's name by the term 'Haversian canals.' His other publications are a *Survey of the Microcosme* (1695), and a *Discourse of the Concoction of the Food* (1699).

HAVERSACK (Fr. *havresac*, from Ger. *Habersack*, *Hafersack*, haversack, sack for oats, from *Haber*, *Hafer*, oats + *Sack*, sack). A canvas or strong duck cloth bag, carried by soldiers on the march. It is a part of the man's equipment, and on service contains the rations for immediate consumption. It is worn on the left side, secured by a strap passing over the right shoulder.

HAVERSCHMIDT, hä'vĕr-sĸmĭt, FRANÇOIS (1835-94). A Dutch poet, born at Leeuwarden. He studied for the Church at Leyden, and undertook two small charges in 1859. Three years afterwards he went to Nieuwediep, and in 1864 to Schiedam. There he published some prose essays, *Familie en Kennissen* (1876); but he is better known as 'Piet Paaltjens,' under which name he published all the poems written after his early youth—*Snikken en Grimlachjes* (1867), of which six editions were called for in two years.

HAVER'SIAN CANALS. See BONE.

HAV'ERSTRAW. A village in Rockland County, N. Y., 32 miles north of New York City. It is picturesquely situated on the west shore of the Hudson River, which here expands into Haverstraw Bay, and on the New Jersey and New York and the West Shore railroads (Map: New York, F 4). It is principally engaged in brickmaking, and has a public library. The village is governed under a general State act, the administration being vested in a president and a council chosen at the annual charter election. Population, in 1890, 5070; in 1900, 5935. Haverstraw was settled by the Dutch, became a precinct in 1719, and was incorporated as a town in 1854. At the house of Thomas H. Smith, since called the 'Old Treason House,' Arnold met André in September, 1780, to arrange for the surrender of West Point. In 1825 the 'Haverstraw Community' was organized here, but broke up in a few years. Consult an article, "Smith House at Haverstraw," in *Magazine of American History*, vol. v.

HAVET, à'vâ', ERNEST (1831-89). A French philosopher, born in Paris. After some educational appointments of minor importance, he was on the staff of the Normal School (1836), and became also professor of French literature at the Collège de France (1855-85), and member of the Academy of Moral and Political Sciences. His best works are an edition of Pascal's *Pensées*, with commentary (1881), and *Le christianisme et ses origines* (4 vols., 1871-84).

HAV'ILAH. A country in Arabia. It is mentioned in Gen. ii. 11-12 as surrounded by the river Pishon and containing gold, bdellium, and *shoham* stone; in Gen. x. 29 (I. Chron. i. 23), as one of the districts of Joktan; in Gen. x. 7 (I. Chron. i. 9), as one of the tribes of Cush; in Gen. xxv. 18, as bordering on the territory of the Ishmaelites; and in I. Sam. xv. 7, where, however, the name should probably be emended into Telam. Niebuhr found a district called Huwaila between the seats of the Beni Khalid and Oman on the Persian Gulf. In South Arabian inscriptions a Khaulan is mentioned. The products of this country referred to in Gen. ii. 11, gold, the gum of the *bedolach* tree, and the *shoham* stone, which is the Assyrian *samtu*, or malachite, seem to point to Jemama and Northeast Arabia extending to the Persian Gulf (Glaser). As the priestly additions to the law (see HEXATEUCH) connect the South Arabian tribes with Africa, Gen. x. 7 may be explained without the theory of an Arabian Cush. Consult: Glaser, *Skizze der Ge-*

schichte und Geographie Arabiens (Berlin, 1890); Meyer, *Geschichte des Alterthums*, vol. i. (Stuttgart, 1889); and the commentaries on Genesis by Dillmann (Leipzig, 1892) and Gunkel (Göttingen, 1901).

HAV'ILAND, WILLIAM (1718-84). An English soldier in the French and Indian War in America. He was born in Ireland, and in 1739 was appointed ensign in an infantry regiment, with which he is believed to have served at Porto Bello and Cartagena. During part of the rebellion of 1745 he was aide-de-camp to Colonel (afterwards Lord) Blakeney, and subsequently returned to Ireland, where he remained until 1752, when he was appointed a lieutenant-colonel. In 1757 he went to America with a regiment, was in command at Fort Edward during the winter of 1757-58, served under Abercromby at Ticonderoga, and later under Amherst. In 1760 he was put at the head of a mixed force of colonists and Indians, 3400 strong, and ordered to force a way by Lake Champlain, defended by a French post at Isle aux Noix, and to join the armies of General Murray and Lord Amherst, which were converging on Montreal. He was entirely successful. After the capitulation of Montreal he served in the West Indies, and was present at the conquest of Havana in 1762. An energetic and resourceful officer, he was advanced in rank until he was made general in 1783.

HAV'ILDAR' (Hind. *havāldār*, from Hind., Pers. *havālah*, Ar. *havālat*, charge, custody + Pers. *dār*, possessing). The highest non-commissioned rank in the native army of British India.

HAVIN, à'văn', LÉONOR JOSEPH (1799-1868). A French politician, born in Paris. He studied law, became justice of the peace at Saint-Lô (1830), and for the following seventeen years was Deputy from the Department of La Manche. He was a prime mover in the agitation which led to the February Revolution, but allied himself with the Moderates in the National Assembly of 1848-49. He continued to take a prominent part in the Republican Government up to 1851, but after the coup d'état he lost his position in the State Council, and his influence was henceforth exerted through his journal, *Le Siècle*, which became noted for good judgment and loyalty to liberal principles.

HAVLÍČEK, hăv-lē'chĕk, KAREL (1821-56). A Bohemian journalist, critic, and poet, born at Borová, whence his pseudonym, 'Havel Borovský.' He studied at Prague, taught at Moscow, and after his return to Bohemia wrote for the *Národní Noviny* at Prague, and at Kuttenberg for the *Slovan*. For his liberal articles in these journals he was imprisoned at Brixen in the Tyrol, where he wrote the sarcastic *Tiroler Elegien*. He returned to Bohemia in 1855, and died at Prague in the following year. He wrote many clever epigrams, which have not all been published; the satiric poem, *Křest sv. Vladimira* (1877); and translations from Gogol, Voltaire, and others. His collected works, *Sebrané Spisy*, contain a part of his epigrams. His biography, by Tuma, was published at Prague (1883).

HAVRE, à'vr', LE. The second seaport of France, and the capital of an arrondissement of the Department of Seine-Inférieure, on the estuary of the Seine, 108 miles northwest of Paris (Map: France, F 2). It is a well-built and regularly laid out city, with a number of fine boulevards and squares, as the Boulevard François I., Strasbourg, and the Course de la République, the chief boulevards occupying the site of the ancient ramparts. The most prominent public buildings are the city hall, built in Renaissance style; the Church of Notre Dame, dating from the sixteenth century; the exchange, the Palais de Justice, arsenal, and custom-house. The museum has fine statues of Bernardin de Saint-Pierre and Casimir Delavigne (both natives of Havre), and contains collections of paintings and sculptures and a library of about 50,000 volumes. The harbor, formed in part by an immense dam, is regarded as one of the best in France, and has a capacity of about 500 vessels. Its entrance, defended by two forts and a number of batteries, is barely 300 feet in width. The harbor is divided into nine separate basins, and has over eight miles of quays.

The situation of Havre at the mouth of the Seine gives it great advantage in regard to the internal trade of the country, while its position on the English Channel makes it one of the chief centres of the foreign trade. The annual imports and exports exceed 2,000,000 tons, valued at nearly 2,000,000,000 francs. The chief articles of import are coffee, cotton and cotton goods, grain, hides and skins, silk, etc. The exports are mainly silk and cotton goods, coffee, clothing, metal articles, and artificial flowers. Havre has a number of large industrial establishments, including sugar refineries, chemical and glass works, breweries, ship-building yards (for battleships as well as merchant vessels), electrical works, and works for the manufacture of guns and heavy ordnance. Population, in 1896, 119,470; in 1901, 130,196.

Havre, originally named Ville Françoise, or Françoiseville, and afterwards Havre de Grâce, was founded in 1517 by Francis I., from whom it received numerous privileges. It was surrendered to the English by the Huguenots in 1562, but was retaken by the French soon afterwards. It was bombarded by the English in 1694, 1759, 1794, and 1795. Havre owes its harbor improvements to Richelieu, Louis XIV. (who employed Vauban), Louis XVI., and Napoleon.

HAVRE DE GRACE, hăv'ĕr de grâs. A city in Harford County, Md., 36 miles northeast of Baltimore; on the Susquehanna River, near its mouth, in Chesapeake Bay, and on the Baltimore and Ohio and the Philadelphia, Wilmington and Baltimore railroads (Map: Maryland, N 2). It makes large shipments of coal and lumber, and has shad and herring fisheries, flour, cotton, saw, and planing mills, and can and shoe factories, and carries on fruit-canning. On Battery Island is a Government fish hatchery. Population, in 1890, 3244; in 1900, 3423.

HAWAIIAN (hä-wī'an) **ISLANDS,** or **HAWAII,** hä-wī'ē (formerly SANDWICH ISLANDS; politically, the TERRITORY OF HAWAII). A chain of islands in the Pacific Ocean, belonging to the United States, and forming geographically and ethnologically the extreme northeastern group of Polynesia. They are situated between latitudes 18° 54′ and 22° 15′ N., and between longitudes 154° 50′ and 160° 30′ W., about 2200 miles southwest of San Francisco, and 4893 miles from Hong Kong. The chain consists of eight inhabited and several small uninhabited islands, ar-

ranged nearly all in single file extending for about 400 miles from southeast to northwest. The inhabited islands with their areas are, beginning at the southeast: Hawaii, 4210 square miles; Maui, 760; Kahulaui, 63; Molokai, 270; Lanai, 150; Oahu, 600; Kauai, 590; and Niihau, 97. Total area, 6740 square miles. Small as the land area is, it is about half that of all the other Polynesian Islands. Oahu is as large as the Society group; Maui corresponds in size with the Marquesas group; and the island of Hawaii is nearly as large as all the other Polynesian groups.

Topography and Geology. The islands are purely of volcanic origin, being really the summits of enormous volcanic cones raised by eruptions from the bottom of the ocean, which falls rapidly to a depth of 18,000 feet not far from the shores. The islands are all mountainous, but only one, Hawaii, is actively volcanic, having two of the largest craters in the world, Mauna Loa and Kilauea (q.v.). Hawaii is the most recent in order of formation; it is much less eroded than the others, and though it contains the highest peak of the group—Mauna Kea, 13,805 feet—its elevations are all rounded and easily ascended. The other islands, especially Kauai, which is considered the oldest, are deeply eroded into picturesque crags and deep ravines and gorges. The coasts are to a large extent steep and rocky, consisting in some places of precipices 100 to 500 feet high and extending for several miles. There are some sandy beaches, however, and in many places the coasts are lined with coral reefs; between the mountains and the coasts extend fertile plains and valleys, which are the scene of agricultural activity.

Climate and Hydrography. The climate is in general characterized by a remarkable equability of temperature; it is never too warm and never cold, except on the mountain summits, and even within the narrow limits there are no sudden changes. This is due to the fact that there are neither large ice-fields nor hot continental deserts within thousands of miles, and the winds which reach the islands have to pass over a broad expanse of water of a uniform and moderately warm temperature. The average temperatures of the lowlands of Hawaii are 70° for January and 78° for July, and the extreme maximum and minimum temperatures recorded are, respectively, 89° and 54°. On the mountain peaks, of course, frosts occur, and snow sometimes remains throughout the year. The mean temperature is about 10° cooler than in any other land in the same latitude. The winds show the same equability; the prevailing winds for ten months in the year are the northeast trades. Alternate diurnal land and sea breezes occur, especially on the southwest coasts and around Hilo Bay on the northeast coast of Hawaii; warm southwest gales are also common in winter. Storms are rare, and hurricanes unknown. With respect to humidity and rainfall, however, the climate is extremely varied, each narrow locality having its own peculiar climate, depending on its position with regard to the winds and mountains. Most of the rain is brought by the northeast trade winds, and, owing to the great elevation of the islands, it is almost all precipitated on the northeastern sides, which have accordingly the most varied vegetation, while the leeward or southwestern sides are much drier and, especially in Hawaii Island, almost arid. Just above Hilo Bay, where the cold winds from the mountains meet the warm and moist trade winds, there is an annual rainfall of 100 to 200, and even 250, inches, one of the heaviest in the world; but at Honolulu the rainfall is only about 32 inches a year. Though the sky is as a rule clear and sunny when it is not actually raining, the humidity is considerable, turning to almost oppressive sultriness during the winter southwest winds. In general, the climate is very healthful and agreeable to Europeans, but it is not an ideal one for cases of pulmonary tuberculosis.

The rivers of Hawaii are nearly all small mountain torrents, and, as might be foreseen from the foregoing, they are largely confined to the north and east sides of the island.

Flora and Fauna. The indigenous flora and fauna of Hawaii are interesting, as they partake of the characters both of the Asiatic and Australian, as well as of the American flora. There are about 130 species of ferns and 900 species of flowering plants, of which 600 are peculiar to the islands. Some of the characteristic plants are a peculiar Pandanus or screw-pine, several tree-ferns, and among the forest trees the Koa (*Acacia Koa*). Forests still cover large areas of the uplands, but have greatly decreased. Where vegetation is found it generally grows luxuriantly, but large areas, especially in Hawaii, are covered with naked lava fields.

There are very few indigenous mammals in Hawaii, and no reptiles, except a single species of lizard. The birds are interesting, including many peculiar and highly specialized species, notably in the family Drepanididæ, which differ characteristically from those of the rest of Polynesia. The land mollusks have also reached a remarkable development, almost every valley having its own peculiar species, some of which are allied to those of Mexico and California.

Agriculture. Hawaii is of industrial interest almost wholly by virtue of its agricultural development. The physical and climatic conditions make possible the successful cultivation of a very large variety of industrial plants, including those of both the temperate and tropical zones. The area of possible cultivation is greatly limited, however, by the decidedly mountainous character of the islands and the area covered with lava. Less than half the total area, or about 2,000,000 acres, is adaptable to grazing, and 294,000 acres are improved. The soils, wholly derived from basaltic lavas, are formed either by decomposition (the dark and light red and yellow soils) or by sedimentation, the decomposed rocks being removed by rainfall to lower altitudes. The highland soils are thin and poor, having been depleted of many soluble elements that nourish plants; the upland soils (dark red), just above the sedimentary flats and lowlands, and the lowland soils are very deep and remarkably productive. In a general way the variety of crops depends upon the elevation. Sugar-growing is largely confined to the low plains and hillsides, followed on the higher levels in turn by coffee, fruits and vegetables, and pasture lands, but these zones are not clearly defined. In the census year 1900 there were only 86,854 acres in crops. Prominent among the factors which have prevented a fuller development have been the absence of a local market and the great scarcity

Map of
HAWAII,
(To United States)
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SCALE OF STATUTE MILES.
47 MILES TO THE INCH.
PACIFIC OCEAN
KAUAI
NIIHAU
OAHU
MOLOKAI
LANAI
MAUI
KAHOOLAWE
HAWAII
HONOLULU
HILO
Kaiwi Channel
Kaieie Waho Channel
Pailolo Channel
Alenuihaha Channel
Kealaikahiki Channel
TO YOKOHAMA, 4,345 MILES, AND HONGKONG, 4,917 MILES
TO SAN FRANCISCO
TO SYDNEY
TO AUCKLAND
Pearl Harbor
Pearl River Entrance
Punch Bowl Hill
Telegraph Hill
Diamond Hill
Leahi or Diamond Head
Kapua Entrance
Quarantine I.
Mokuoloe I.
Breakers
Ahua Pt.
Salt Lake
Mauna Loa
Kilauea
Kona
Kau
Puna
Hamakua
Hilo
Kona
Kohala
Kona
Kau
Puna
Hamakua
Hilo
Kona
Kau
Puna
Hamakua
Hilo
Kona
Kau
Puna
Hamakua
Hilo

AREA AND POPULATION OF HAWAII.

	Map Index.	Area in square miles.	Population.	
			1890.	1900.
Island of Hawaii	F 4	4,015	26,754	46,843
Islands of Kauai and Niihau	B 1 and A 2	641	11,859	20,734
Island of Maui	E 3	728	17,357	25,416
Islands of Molokai and Lanai	D 2 and D 3	3	2,826	2,504
Island of Oahu	D 2	600	31,194	58,504

of labor. At an earlier date the unsettled political conditions and the uncertainty of the continued favor of the United States discouraged the investment of capital. Thus far, sugar-cane is the only plant extensively raised. The sugar industry dominates the entire industrial life of the islands. Over half the population is engaged in the industry in some capacity. Any cause that lowers the price of sugar injuriously affects the general prosperity. Sugar-cane has long been grown on the islands of Hawaii, Maui, Kauai, and Oahu, and has recently been introduced on Molokai and Lanai. There are over 60 great plantations now in operation. The acreage in sugar in 1900 was over 65,000 acres, and the annual production, about 225,000 tons, varies considerably from year to year.

The sugar industry involves large outlays of capital, and is, therefore, not suited to a system of small proprietorship. On the contrary, the system of cultivation resembles in some ways the old plantation system of the South with its gangs of laborers and overseers. The scarcity of labor led to its importation under contract, especially from Japan and China, and the greater part of the labor force has been thus secured. To those under contract, labor is compulsory and enforced through the courts, violence being forbidden. On the west side of the islands irrigation is required, but under irrigation the cane grows more quickly and yields more abundantly than on the east side. Water is conducted from the mountain streams through flumes, which also often serve for the conveyance of cane to the mills. Rice occupies as yet the second place in area of production, and in the value of the product. The lowest flats close to the sea are used for rice. The home consumption is so large that only a few million pounds are left for export. It is cultivated almost wholly by the Chinese. Coffee is a young industry, and though it is cultivated on the four larger islands, it is not yet important. The prospects of the coffee industry are regarded as most favorable, as the coffee-berry is a natural product of the islands, where it grows wild. Little progress has been made in the raising of most fruits, vegetables, and cereals; but bananas and pineapples are raised in export quantities. The finest pineapple is a small native variety. The bananas are known for their good quality. Recent experiments show that American maize grows and matures perfectly. The natives raise very few vegetables for the market, only taro and a few Irish potatoes coming from the country districts. Honolulu is supplied with vegetables almost wholly by the Chinese, who occupy suitable lands around the city.

Owing to the uncertainty of rainfall in the pasture area, and to the horn-fly nuisance, the stock-raising industry is but little developed. Almost every native possesses from one to three horses. According to an arrangement made in 1848, the greater portion of the land was divided between the King, the chiefs, and the Government. The portion received by the chiefs has passed almost wholly into the hands of foreigners. The crown-lands and the Government lands, amounting to about 1,750,000 acres, were assumed by the United States. In 1895 a land act, passed to regulate the disposal of this land, was carefully drawn with a view to preventing its monopolization by speculators, and to securing its division into homesteads for actual settlers. It may be acquired by individuals for 'homestead lease,' lease with right of purchase, cash freehold, etc., the amount that can be acquired generally being limited in a manner that prevents capitalists from acquiring permanent control of the land.

Manufactures. The lack of fuel and of metals will permanently limit the scope of Hawaii's manufactures. Sugar manufacture is the only branch of this industry which is at present important. No molasses is made, nor is the sugar refined within the Territory. In 1900 there were 44 sugar-making establishments, with 2369 hands employed, $7,991,000 capital invested, and an annual product estimated at $19,254,000. The combined product of the three fertilizer establishments and that of the four foundry and machine-shops each exceeded $1,100,000. The capital invested in the islands came almost wholly from the United States.

Transportation. The islands are favorably situated for purposes of communication with the rest of the world, inasmuch as they are on the line of traffic between the United States and the Southern Asiatic countries and Australia. They are a convenient midway station, and many vessels renew their supply of coal at the islands. The port of Honolulu is one of the best in the Pacific. It is protected by a coral reef, through which a channel 30 feet deep has been cut to admit large vessels. The harbor facilities have not increased as rapidly as has the commerce, and the limitations are such that recourse may ultimately have to be taken to Pearl Harbor, five miles to the north, which offers unlimited facilities, and requires only the cutting of a channel through the reef for a passageway. In 1900 the tonnage of merchant vessels entering Hawaiian ports was 786,800, of which 363,160 was American. Regular steamboat communication is maintained between the larger islands of the group. The principal railroad extends along the coast of Oahu from Honolulu northward and east to Kahuku. Other short lines have been constructed, chiefly on the sugar plantations.

Commerce. The limited home market for the principal product of the islands and the lack of home manufactures give rise to a very large export and import trade. The following figures show the development of the merchandise trade with the United States:

Imports from Hawaii to the United States, 1880, $4,606,000; 1890, $12,313,000; 1900, $20,707,000.

Exports from the United States to Hawaii, 1880, $2,086,000; 1890, $4,711,000; 1900, $13,500,000.

Uncorrected estimates for 1901 place the exports and imports respectively at $28,000,000 and $20,000,000. The exports are almost exclusively sugar, and the imports principally machinery used in the sugar industry and other manufactured products. The trade of the United States with these islands is more than four times that of the United States with the Philippine Islands. Our large trade with Hawaii has developed almost wholly since 1876, the year of the reciprocity treaty, which made possible the growth of the sugar industry. Practically all

of the exports of the islands come to the United States, while the imports from foreign countries —of which coal is the most important item— are less than a third of the amount received from the United States.

FINANCE. The total cash receipts for 1901 amounted to $2,140,000, of which $1,230,000 were collected by taxation. The total expenditures were $2,925,000, the largest items being 'public works,' 'health,' and 'public instruction.' The assessed value of property increased almost fourfold from 1892 to 1901.

POPULATION. The population of Hawaii is exceedingly heterogeneous, and the question of population is one of the most vital and difficult with which the present and future welfare of the islands is concerned. The earliest estimate of the native population, that of Captain Cook in 1778, placed the number at 400,000, which is generally considered as being about a fourth too large. At any rate, the native population soon after this date began rapidly to diminish. The decline is shown by the following figures: in 1823, 142,000 (missionaries' estimate); in 1872, 49,044; in 1890, 31,019; and in 1900, 29,834. The cause of this decline is not fully understood, but prominent among the reasons assigned is the introduction of foreign diseases, which have proved peculiarly fatal to the natives, and the small birth-rate, which is the result in part, at least, of a maternal aversion to domestic responsibilities. In Honolulu the death-rate per thousand in 1900 for Hawaiians was 42.81, which is abnormally large. These tendencies therefore indicate the ultimate extinction of the race. Notwithstanding the disposition shown by the Hawaiians freely to intermingle with other races, there is a remarkably small number of 'part Hawaiians,' as will be seen in the table below. Marriages between natives and Chinese are common, but the Japanese have shown an aversion to mixed marriages. The decrease in the native population and their disinclination to work made necessary the importation of labor. Among those first imported were the Portuguese from the Azores, but these were not inclined to reëngage as plantation laborers at the expiration of their three-year contract, and subsequent importations have been almost wholly of the lower class of Chinese and Japanese. An attempt to introduce Polynesians did not result satisfactorily. Immediately after the establishment of the Republic, the Japanese came in large numbers, but a treaty with Japan in 1899 gave the United States the right to regulate immigration, and in the year ending in June, 1901, there were only 391 immigrants from that country. The United States law restricting Chinese immigration applies to the islands, and this source of labor is now closed. Prior to the annexation to the United States the Government encouraged and aided immigration, though endeavoring at the same time to check the inflow of Chinese. Under the United States control Government aid ceased, and Chinese laborers are not allowed to enter. The last labor experiment was the importation of Porto Ricans, but they did not prove very satisfactory. The Chinese are the most desirable unskilled labor that can be obtained, and the planters are loud in their demands for the United States to admit them. The population for 1890 and 1900 was as follows:

	1890	1900
Hawaiians	34,436	29,834
Part Hawaiians	6,186	7,835
Caucasians	21,300	28,533
Chinese	15,300	25,742
Japanese	12,360	61,122
South-Sea Islanders	409	407
Negroes	.....	254
Total	89,991	153,727

Of the Caucasians in 1900, 12,061 were Hawaiian born, 4068 were born in the United States, and 12,357 were foreign born. More than two-thirds of the total population are males. The inhabitants by islands were as follows: Hawaii, 46,843; Oahu, 54,504; Maui, 25,416; Kauai and Niihau, 20,734; Molokai and Lanai, 2504. Honolulu, on the island of Oahu, is the principal city; population, in 1900, 39,306.

ETHNOLOGY. The original inhabitants of the Hawaiian Islands are, in physique, good representatives of the Polynesian race, rather tall, and often quite good-looking. In head-form they have a tendency toward brachycephaly. In language the Hawaiians are most nearly related to the Samoans and Tahitians, but their speech has some phonetic and grammatical peculiarities of its own. In mental ability and artistic genius the Hawaiians rank high among their kindred, as their advanced governmental institutions, their assimilation of foreign culture, their industrial and artistic manufactures (kapa-printing, straw-plaiting, feather-weaving, etc.), and their development of a literature amply demonstrate. The love of Hawaiians (and other Polynesians) for games and sports proves them not incapable of action requiring both mental and physical exertion. It was upon one of the peculiarities of the Hawaiian family system, the *punulua*, a sort of incipient polyandry, that Morgan (1871-77) based his second stage in his scale of evolution of the family, the '*punuluan* family.' From the older culture the *Kahuna* beliefs, the *hula-hula* dance, etc., have survived. The advent in 1900 of Papa Ita, the Tahitian 'fire-walker,' proved how much of the ancient Hawaiian religion was still alive beneath the cover of Christianity.

RELIGION. With a population representing so many races, there is naturally a variety of religions. The great activity of the early missionaries succeeded in bringing the native population within the fold of the Christian Church. However, the Christian faith is ofttimes lightly held, and their old-time pagan practices are sometimes secretly indulged in. The native Protestant following is nearly twice that of the Catholic, the Mormons among them numbering about 4000. The Portuguese are mainly Catholic; but most of the other European and American elements represented are Protestant. The Chinese and Japanese hold generally to their Oriental faith.

EDUCATION. One of the earliest results of missionary effort in Hawaii was the establishment of schools. The first Constitution (1840) provided for a school in districts wherever fifteen or more children suitable to attend school lived close together. At present the school attendance is compulsory for the entire school year for children between the ages of six and fifteen,

and tuition is free. Ninety-six per cent. of all children of the above class attend school; 83 per cent. of all those of Hawaiian blood above six years old can both read and write. In all schools the English language is the basis of instruction. The supervision of the schools is in the hands of a Minister of Public Instruction and six commissioners. No person in holy orders nor any minister of the gospel is eligible as commissioner. The salaries of teachers are high compared with those received by teachers in the States. There were 559 teachers in 1900, of whom 299 were American. The climatic conditions do not necessitate heavy investments in school buildings, and the tuition constitutes about 73 per cent. of the total cost. The per capita expenditure is about $2.17, which amounts to $23.36 per capita for those who attend school. There are a normal training school, high school, and an endowed college at Honolulu. There are six private boarding schools for Hawaiian girls. See EDUCATION, COLONIAL.

CHARITABLE INSTITUTIONS. The principal public charitable enterprise is the maintenance of the leper settlement on the island of Molokai. The settlement is located on a peninsula which is shut off from the mainland by mountains. The number of lepers is decreasing, there being at present in the settlement about 900, nearly all of whom are natives. Some of them own property in the settlement and are self-supporting, but the Government makes every effort properly to care for them, and the annual expense is heavy. A certain amount of local self-government is allowed in the settlement.

GOVERNMENT. By an act of Congress in 1900, Hawaii was organized with a Territorial form of government, similar to that of the other organized Territories of the United States. It has a Territorial representative in Congress. The capital is Honolulu. See the article on TERRITORIES.

HISTORY. Peopled probably from the Polynesian Islands, the Hawaiian Islands when first known to white men had passed through the first stages of savagery, and were progressing toward civilization. The particular stage which it had reached was that of feudalism. Instead of a heterogeneous collection of tribes, there were in the eighteenth century as many kings as there were inhabited islands in the group, and in the island of Hawaii there were at least two kings. The people held the land which they tilled in tenancy to a class of middlemen, or gentry, who served subordinate chiefs, who were themselves under the control of the dukes or high lords, who owed allegiance to the King. The land was held in military tenure. Society was highly organized into orders, religious and social, with a system of checks, by means of laws and ceremonies. The whole tendency of political movement was toward centralization.

The first white men in Hawaii were the survivors of the crews of two Spanish vessels which were wrecked on the islands as early, possibly, as 1527. They intermarried with the natives, and their descendants, recognized by their Caucasian characteristics in complexion and features, are known to this day at Kekea. Gaetano, in 1542, made a landfall here, and in 1567 Mendena located scientifically the position of Kauai, as has been shown by Spanish scholars; but it was reserved for Capt. James Cook (q.v.), while on his third voyage in the Pacific, to find this group in 1778. After returning from Bering Strait, to pass the winter in Hawaii, he abused the hospitality of the natives, and in a squabble lost his life. His estimate of the population at 400,000, though an undoubted exaggeration, shows that the group was densely inhabited. Cook named the group Sandwich Islands, after John Montague, the fourth Earl of Sandwich (1718-92). In 1790 Kamehameha, one of the kings of the main island, defeated Keoua, a rival in another portion of the same island, and thus paved the way for the establishment of a single dynasty. Kamehameha's ambition was to bring the whole group of islands under his sway, but with ordinary weapons it is uncertain whether he could have succeeded. In the nick of time, American whalers and fur traders brought the King firearms, which gave him a tremendous advantage over his opponents, who were still living as in the Stone Age. In 1792 the British navigator George Vancouver brought over cattle, and taught the inhabitants ship-building. At the beginning of the nineteenth century the fur trade on the Pacific coast received a tremendous impulse as a result of the epoch-making expedition of Lewis and Clark. American vessels, reaching the northwest coast in the spring, traded up and down it with the Indians for peltries. Spending the winter in the Sandwich Islands, the American shipmen dressed their furs, refitted, laid in fresh provisions, and bought the sandalwood then so abundant in the islands, besides sharks' fins and tortoise-shells, for the China trade. To this day in China the name for Hawaii is 'Sandalwood Islands.' In the second spring season they went north on the American coast for furs, stopping again at Hawaii, and then sailing to China and exchanging their cargo of furs and sandalwood for tea, silk, porcelain, matting, ginger, and firecrackers, they sailed homeward with a favorable monsoon. Native Hawaiians served on these ships, and thus became known in the United States, stimulating missionary interest.

This trade in sandalwood enriched the chiefs and kings, but especially Kamehameha, who thus secured the sinews of war by sending his people all over the island to cut and transport the fragrant wood, which he traded for vessels, arms, ammunition, and military stores. Master of a navy and an army, he was able, after several campaigns, to conquer the whole of the Hawaiian archipelago. He made the once feudalized islands a central monarchy, and established the royal succession in his own line. He died May 8, 1819, and his oldest son, Liholiho, succeeded him, under the title of Kamehameha II., though the real power behind the throne was an 'empress dowager,' the widow of Kamehameha I. Under the old religious system of taboo (q.v.), which represented conservatism, a class of men corresponding to the 'literati' of other lands existed who were more or less hostile to change, and especially to centralization. So, exactly as in the case of China, when feudalism was overthrown by She-Hwang-Ti, the new King, advised by his Premier, the widow of Kamehameha I., abolished by decree the hoary system of taboo. This bold reform met with organized resistance, and in the appeal to arms a bloody battle was fought. The conservatives were overthrown, and the iconoclasts went through the islands smashing and burning the idols, or tossing them into the

sea. Thus the Hawaiians were a people without a religion. At this juncture of affairs Christian missionaries from the United States arrived. More than ten years before, native Hawaiians, serving as sailors on American ships, had stirred the generous impulses of New England, and one of the first missionary companies sent out by the American Board of Commissioners of Foreign Missions, seven married men with their wives, reached Honolulu April 4, 1820. The King and his Queen made a voyage to England in 1823, and died there in 1824. This event put fresh power into the hands of the widow of Kamehameha I., who governed the kingdom for nine years, until the younger brother of the deceased King reached his majority and reigned as Kamehameha III. Under the training of the American missionaries, all the people were in a few years taught to read and write. The Ten Commandments were adopted as a basis of laws in 1825, and other criminal laws were enacted in 1827 and 1829. In 1840 the King and his nobles promulgated a constitution granting civil rights to the people. In 1846 he abolished the last relics of feudalism by approving the Land Act, which yielded up the Crown lands and provided for the people becoming owners of the soil. In 1852 the Constitution was revised by the King, and the Legislature and free suffrage were established. Dying on December 15, 1854, Kamehameha III. was succeeded by Alexander Liholiho, son of Kinau, the daughter of the founder of the dynasty. This prince assumed the title of Kamehameha IV. After reigning nine years, honored because of his perseverance in the principles of civilization, he died November 30, 1863, and was succeeded by his brother Lot, as Kamehameha V. During his reign Honolulu became a beautiful modern city, and business and commerce prospered greatly. Nevertheless the new ruler was a reactionary. He forcibly abrogated the national Constitution, and issued another, in which the right of suffrage was limited by a property qualification. When he died, December 11, 1872, without issue, the direct line of Kamehameha became extinct. After four weeks' government by the Cabinet, the Legislature elected the nominee of the people, Lunalilo, as King. He attempted in vain to restore the old Constitution. His short and troubled reign of one year ended February 3, 1874.

Lunalilo died childless, and the Legislature again proceeded to elect a king, and on February 12, 1874, chose David Kalakaua, though their action was violently opposed by Emma, the Queen Dowager. In the riot which broke out between her partisans and the legislators, several persons were injured. The war-ships in the harbor under the British and American flags landed marines and sailors, order was restored, and the King began his reign. Kalakaua visited the United States in 1874, and in 1875 a reciprocity treaty was arranged between that country and Hawaii. This was renewed in 1887. The King made a tour of the world in 1881. Nevertheless he showed a tendency in the latter part of his reign to relapse into the ancient savagery of his people. The patience of the better elements of society being exhausted, the party of progress at a mass meeting held June 30, 1887, demanded from the King a new constitution and better government, with a Cabinet under the control of the Legislature. Although Kalakaua agreed to the demand and signed a new constitution, which was ratified by the vote of the people, he lost no opportunity to regain his power. In this course he was encouraged by his sister, the Princess Liliuokalani. On the King's attempting in 1889 to overthrow the new Government, the progressive party reorganized, and a skirmish occurred in which the royal partisans were defeated. On January 20, 1891, Kalakaua died in San Francisco. His sister, Liliuokalani, became Queen. Her reign was marked by continual evasions and nullification of the Constitution. The men of the progressive party, consisting chiefly of Americans and the better elements among the foreigners and natives, were fully acquainted with her determination to promulgate a new political instrument which would enhance the royal power; but just when she was about to bring her plans to consummation they dethroned the Queen and organized a provisional government. The Committee of Thirteen, January 15, 1893, passed a resolution "that it is the sense of this committee that, in view of the present unsatisfactory state of affairs, the proper course to pursue is to abolish the monarchy, and apply for annexation to the United States." The Queen's ministers appealed for help to the foreign legations, while the leading citizens of the town were openly and publicly preparing to abolish the Queen's government by force of arms. The United States legation was in close touch with the best element both of the Americans and of the native Hawaiians. Realizing the great significance of the Revolution and the importance of the interests of his country that were involved, the United States Minister, John L. Stevens (q.v.), had a force of 140 sailors and marines landed from the U.S.S. *Boston*, for the protection of American interests, and at once recognized the provisional government on behalf of his own. Commissioners were sent to the United States to negotiate a treaty of annexation, while Minister Stevens, believing that this small State was not safe from aggression, on his own responsibility declared Hawaii under the protection of the United States, February 16, 1893. President Harrison submitted to Congress a treaty of annexation, but upon the accession of President Cleveland the treaty was withdrawn, the Minister's action disavowed, and a special commissioner, Mr. Blount, was sent to the islands to report upon the situation. The commissioner's report represented that the action of Mr. Stevens had been unwarranted, and that it was the landing of the United States seamen that made the success of the Revolution possible. The disposition of the United States Government appearing to be favorable to the deposed Queen, negotiations were entered upon for her restoration; but her refusal to grant a general amnesty made it impossible to support her pretensions. Thrown upon its own resources, Hawaii was proclaimed a republic July 4, 1894, and duly organized, with Sanford B. Dole as President, and a Legislature of two chambers. The political excitement that had made the annexation question a disturbing one in the United States having subsided, and the Republican Party being again in power, the Government of Hawaii, then firmly established, renewed negotiations for annexation in 1898.

In accordance with a resolution of Congress, passed July 7, 1898, the Hawaiian Islands were formally annexed August 12, 1898. By the act

of Congress of April 30, 1900, all persons who, on August 12, 1898, were citizens of the Republic of Hawaii, were declared to be citizens of the United States and of the Territory of Hawaii. On June 14, 1900, Hawaii was organized as a Territory, with ex-President Dole as the Territorial Governor. The political problem of Hawaiian administration lies in the number of races, that which is strongest in wealth and intelligence being smallest in numbers.

During the monarchy, which lasted about a century, the foreign relations of Hawaii were influenced chiefly by naval officers, who often acted with a high hand. The first commercial agency of the United States was established in 1820, and in 1823 Capt. Ap Catsby Jones, U. S. N., negotiated a treaty of commerce and navigation, the first ever made by Hawaii with a foreign power, which was not, however, ratified by Congress. In 1839 Commander La Place of the French frigate *Artémise*, under threat of war, demanded privileges for Roman Catholic converts of the French missionaries, who had been on the islands since 1827. In 1842 the independence of the kingdom was recognized by the United States. In 1843 a British officer, Lord Paulet, made demands which resulted in a provisional cession of the islands to Great Britain; but his action was promptly overruled by his superiors at home, and the same year Admiral Thomas restored the islands and the Hawaiian flags. In 1862 the English Reformed Catholic missionaries began their work. In 1843 the United States commercial agent was made a commissioner, in 1863 Minister Resident, in 1898 Minister Plenipotentiary.

BIBLIOGRAPHY. Hopkins, *Hawaii: The Past and Future of Its Island Kingdom* (2d ed., London, 1866); Oberländer and Christmann, *Oceanien* (Leipzig, 1873); Bird, *The Hawaiian Archipelago* (London, 1875); Fornander, *Account of the Polynesian Race, and the Ancient History of the Hawaiian People* (London, 1877); Gordon-Cumming, *The Kingdom of Hawaii* (London, 1883); Bastian, *Zur Kenntniss Hawaiis* (Berlin, 1883); Dutton, *Hawaiian Volcanoes* (Washington, 1885); Kalakaua, *The Legends and Myths of Hawaii* (New York, 1888); *Reports on the Scientific Results of the Voyage of H.M.S. Challenger* (London, 1880-95); "The Hawaiian Islands," in *United States Military Information, Div. of Pub.*, vol. i. (Washington, 1893); Bishop, *Hawaiian Archipelago* (New York, 1894); Marcuse, *Die hawaiischen Inseln* (Berlin, 1894); Alexander, *Brief History of the Hawaiian People* (New York, 1892); Stoddard, *Hawaiian Life* (Chicago, 1894); Achelio, *Ueber Mythologie und Kultus von Hawaii* (Brunswick, 1895); Hawaiian Department of Foreign Affairs, *The Hawaiian Islands* (Honolulu, 1896); Twombly, *Hawaii and Its People* (London, 1900); Musick, *Our New Possessions* (New York, 1897); Shoemaker, *Islands of the Southern Seas* (New York, 1898); Young, *The Real Hawaii* (London, 1899); Whitney, *Hawaiian America* (New York, 1899); Blackmann, *The Making of Hawaii* (London, 1899); Brain, *The Transformation of Hawaii* 1899); Griffin, *List of Books Relating to Hawaii* (Washington, 1898); also the publications of the Hawaiian Historical Society and Bishop Museum at Honolulu.

HAWARDEN, här'den. A market-town in Flintshire, Wales, eight miles southeast of Chester (Map: Wales, D 3). Population of parish, in 1891, 13,610; in 1901, 15,817. Near by stands Hawarden Castle, long the residence of William E. Gladstone. The castle, built in 1752, stands near the ruins of an older one granted by William the Conqueror to his nephew, Hugh of Avranches, called by the Welsh the Wolf. After many vicissitudes it became the property of Cromwell's Lord Chief Justice, Sergeant Glynne, from whom it descended to Mrs. Gladstone. Consult Morley and Friederichs, "In William Gladstone's Village," in *Strand Magazine*, vol. xvi. (London, 1898).

HAWEIS, häz, HUGH REGINALD (1838-1901). An English clergyman and author. He was born at Egham, Surrey; graduated at Trinity College, Cambridge, in 1859; served under Garibaldi at the siege of Capua; and in 1860 became curate of Saint James's Church, Marylebone, London. Indefatigable in his efforts to educate the masses, he strongly advocated the opening of libraries, galleries, and museums on Sundays. He often lectured at the Royal Institution, and was the Lowell Institute lecturer in Boston in 1885. He was the Anglican delegate to the Chicago Parliament of Religions in 1893, and for the next two years continued a successful lecture and preaching tour around the world. His numerous published works include: *Music and Morals* (1871); *American Humorists* (1883); *Christ and Christianity* (5 vols., 1886-87); *The Broad Church* (1891); *Travel and Talk* (2 vols., 1897); and *Old Violins* (1898).

HAWEIS, MARY ELIZA (JOY) (?-1898). An English author, artist, and philanthropist, daughter of the genre painter T. M. Joy, born in London. She married the Rev. H. R. Haweis, was a member of the Society of Authors and of the Society of Woman Journalists, vice-president of the Maternity Society and of the Central National Society for Women's Suffrage, and superintendent of the Mercy Branch of the British Woman's Christian Temperance Union. She exhibited at the Royal Academy, at the Dudley Gallery, and the British Institution, and was a successful illustrator. She wrote *Chaucer for Children*, *Chaucer for Schools*, and *Tales from Chaucer*; conducted a course in Chaucer in the National Home Reading Union; wrote on art, decoration, gardening, and the like; and published a novel, *A Flame of Fire* (1897).

HAWES, hąz, STEPHEN (?-1521). An English poet. He was born probably in Suffolk, and was educated at Oxford. He traveled on the Continent, and became a groom in the household of Henry VII. His rare minor poems are of interest chiefly to bibliophiles. But his *Passetyme of Pleasure, or the Historie of Graunde Amoure and la Bel Pucel* (printed by Wynkyn de Worde in 1509) occupies an important place in the history of English poetry. It is a long allegorical poem written in seven-line stanzas, divided into forty-six chapters. It describes the education and career of a perfect knight. Standing midway between Chaucer and Spenser, Hawes is the connecting link between them. Reprints of sixteenth-century editions have been made by Southey in *English Poets* (London, 1831), and by Wright (Percy Society, ib., 1845).

HAWESVILLE, hąz'vil. A city and the county-seat of Hancock County, Ky., 85 miles west by south of Louisville; on the Ohio River,

and on the Louisville, Henderson and Saint Louis Railroad (Map: Kentucky, E 3). It is in a coal-mining district, and manufactures flour, hubs, shingles, etc. Population, in 1890, 1013; in 1900, 1041.

HAWFINCH (from *haw*, hedge + *finch*). A large European finch or grosbeak (*Coccothraustes vulgaris*), considerably larger than the chaffinch. The adult male has the crown and back chestnut brown, the neck and rump gray, the wings partly black, the larger wing-coverts white. The hawfinch exists numerously over the whole Palearctic Province, and is only partly migratory, but is a very shy bird, avoiding man, and not much is known of its habits. It frequents orchards and hedgerows, seeking for berries and fruit, and gets its name from its supposed partiality for hawthorn-berries. It nests in hedgerows and in forest trees.

HAWICK, hą'ĭk. A manufacturing town and ancient burgh or barony in Roxburghshire, Scotland, at the junction of the Teviot and Slitrig, 50 miles southeast of Edinburgh (Map: Scotland, F 4). It has important hosiery and tweed mills, dye-works, and tanneries. Its antiquities have almost disappeared; the most important is the Moathill, an earthen work 30 feet high and 312 in circumference. Its oldest church, dating from 1214, was rebuilt in 1763. It has fine modern residences, a handsome town hall, a splendid water-supply, and a complete system of drainage. Its municipal charter was granted in 1537. Population, in 1891, 19,200; in 1901, 17,303.

HAWK (AS. *heafoc*, *hafuc*, Icel. *haukr*, OHG. *habuh*, *habih*, Ger. *Habicht*, hawk, from AS. *hebban*, Goth. *hafjan*, OHG. *heffan*, Ger. *heben*, Eng. *heave;* connected with Lat. *capere*, to seize, Alb. *kap*, I seize). A term popularly meaning any bird of prey not an owl nor vulture. In a more restricted sense the word designates a section of the family, the Accipitrinæ, reckoned by falconers among the ignoble birds of prey. They have wings so short as not to extend to the extremity of the tail, and the bill short and curving from the base. In many of their characters and habits, however, they make a very near approach to the true falcons. In this sense the term would exclude eagles, buzzards, harriers, kites, and the like. In fact, however, the scientific use is hardly more exact than the popular, and descriptions of the various birds so called will be found under FALCON, and under the names of groups or species, as BUZZARD; HEN-HAWK; MARSH-HAWK; PIGEON-HAWK; and so on. (See also Plate of EAGLES AND HAWKS.) It should also be noted, however, that in some instances the name is entirely misapplied, ornithologically speaking, to birds whose shape or actions suggest those of a falcon. Examples of this are 'man-of-war hawk' (the frigate-bird) and 'nighthawk' (q.v.), or 'mosquito-hawk' (a nightjar).

HAWK-BILLED PARROT. A large and remarkable parrot (*Derotypus accipitrinus*) of the Amazon and Orinoco valleys, related to the Amazon group (Chrysotis), and especially characterized by an erectile collar or ruff around the back of the neck. This ruff, the breast, and abdomen are dark red, each feather with a blue edge; the head is brown; the shoulder and inside of both wings and tail are black, while the plumage of the back wings and tail above are green. It frequents palm-trees, utters a cry of piercing shrillness, and erects its ruff when angry or excited with a most threatening effect. It is said to become an admirable pet, as it is easily tamed, is very hardy, agile, and graceful in its movements, and is nearly as good a talker as the gray parrot. Consult Greene, *Parrots in Captivity* (London, 1884).

HAWKE, EDWARD, Baron HAWKE (1705-81). An English admiral. He was born in London. He entered the navy in 1720, and served on the North American and West Indian stations until 1725, when he returned to England and passed his examinations. After serving several years on various foreign stations, he came into prominence in the naval engagement at Toulon in 1744, when he broke from the line of battle in order to engage the Spanish ship *Poder*, and succeeded in compelling her to strike her colors. In 1747 he was promoted rear-admiral of the white. In October of the same year he captured six out of a squadron of nine French men-of-war convoying a fleet of merchant vessels bound for the West Indies, and was created a Knight Companion of the Bath. In December of the same year he was chosen member of Parliament for Bristol. In May, 1748, he became vice-admiral of the blue, and in January, 1755, admiral of the white. In 1756 he succeeded Admiral Byng as commander of the fleet in the Mediterranean. In 1759 he took charge of a squadron sent to cruise off Brest, and to intercept a French fleet preparing for an invasion of England. On the morning of November 20th he sighted the French fleet under Admiral Conflans, off Belle-Isle, and notwithstanding that the French, trusting to their knowledge of the rocks and shallows, retired toward the shore, he engaged them with such impetuosity that more than half of their vessels were either disabled, captured, or driven on shore. For this victory, gained with the loss of only two vessels, Hawke received the thanks of the House of Commons and a pension of £2000 per annum. In 1765 he was appointed Vice-Admiral of Great Britain and First Lord of the Admiralty. In 1776 he was raised to the peerage, by the title of Baron Hawke of Towton. He died at Sunbury, October 17, 1781. Consult Burrows, *Life of Edward Lord Hawke* (London, 1883).

HAWK-EAGLE. A convenient term for a group of large birds of prey of the Old World, which combine characteristics of both eagles and hawks, and in most cases are crested. The best known of these is Bonelli's hawk-eagle (*Nisaëtus fasciatus*), which ranges from Spain (where it is a common resident on the rock of Gibraltar) to the Far East, where it is one of the largest and most prominent birds of prey. In India it is numerous and conspicuous, both in the high mountains and in the lowland jungles, and is one of the large hawks called 'peacock-killers.' The booted eagle (*Nisaëtus pennatus*) of the Mediterranean region, noted for its shrill scream, and the beautiful great crested eagle of Africa (*Spizaëtus bellicosus*), are other representatives of the group, in which some authors include the crested 'eagle-hawks' of tropical America.

HAWKE BAY. An inlet on the east coast of North Island, New Zealand, which gives its name to a provincial district, and a county be-

tween Auckland and Wellington (Map: New Zealand, F 3). The bay was named after Sir Edward Hawke, First Lord of the British Admiralty, when Captain Cook on October 8, 1769, entered it for the first time. Napier, the chief city and port of the district, is on the bay. European settlement dates from 1848.

HAWKER. See PEDDLER.

HAW'KER, ROBERT STEPHEN (1803-75). A Cornish poet and antiquary, born at Stoke Damerel, Devonshire. He was educated at Pembroke College, Oxford (where he won the Newdigate prize in 1827 by a poem on Pompeii), was ordained in 1831, and went as vicar to Morwenstow, Cornwall, in 1834. Afterwards the neighboring parish of Wellcombe was added to the living. Hawker did much for the people in his poor parish during his forty years as priest among them, especially for the sea-faring men. Toward the end of his life he became a Roman Catholic, and in his last hours was received into that Church. His works include: *Records of the Western Shore* (1832; second series, 1836); *Ecclesia* (1840-41); *Reeds Shaken by the Wind* (1843); *Second Cluster* (1844); *Echoes from Old Cornwall* (1846-47); *The Quest of the Sangraal* (1864); *Cornish Ballads and Other Poems* (1869 and 1884). His collected poetical works appeared in 1879, with a notice by J. G. Godwin. He also wrote *Footprints of Former Men in Far Cornwall* (1870). His most celebrated poem, *Trelawny*, first published anonymously, was believed, even by such men as Scott and Dickens, to be an old ballad. Consult: Lee, *Memorials of the Late Rev. R. S. Hawker* (London, 1876); and Gould, *The Vicar of Morwenstow* (London, 1876). Mortimer Collins pictures Hawker as Canon Tremaine in his novel *Sweet and Twenty.*

HAWKES'BURY. A river of New South Wales, Australia. It rises in the Blue Mountains, and flows northeast parallel with the coast until it passes Windsor, where it turns to the southeast and enters the Pacific at Broken Bay, 20 miles north of Sydney (Map: New South Wales, F 3). Its length is about 330 miles, and it is navigable for ships of 100 tons to Windsor, about 50 miles from its mouth. It is crossed by a steel railway bridge, 2900 feet long. The Hawkesbury is remarkable for its inundations, and in 1844 the waters rose 20 feet in a few hours.

HAWKESBURY. A lumber town and terminus of a branch line of the Canada Atlantic Railway, in Prescott County, Ontario, Canada (Map: Ontario, J 2). It is on the river Ottawa, 55 miles northwest of Montreal, and has ferry communication with Grenville on the opposite bank. Population, in 1891, 2042; in 1901, 4150.

HAWKES'WORTH, JOHN (c.1715-73). An English writer. Apprenticed to an attorney, his first steps in literature were in the footprints of Samuel Johnson, compiling Parliamentary debates for the *Gentleman's Magazine* (1744), in which some of his poems were afterwards published. Most of his essays appeared in the *Adventurer*, successor of the *Rambler*, which was very popular during the two years of its existence (1752-54), and of which Hawkesworth was editor and joint founder. Besides adapting old and writing such new plays as *Edgar and Emmeline* (1761), he wrote the words for an oratorio, *Zimri* (1760); an Oriental tale, *Almoran and Homet* (2 vols., 1762); translated Fénelon's *Télémaque* (1768); prepared an edition of the *Works of Jonathan Swift* (6 vols., 1755), and an unsatisfactory account for the Government of the voyages of Captain Cook and others in the southern seas. He was for some time intimate with Dr. Johnson, whose style he could imitate to perfection; and his portrait was painted four times by Sir Joshua Reynolds.

HAWKEYE. One of the names by which Natty Bumppo is called in Cooper's Leatherstocking novels.

HAWKEYE STATE. Iowa. See STATES, POPULAR NAMES OF.

HAWKING. See under FALCONRY.

HAW'KINS, ANTHONY HOPE (1863—). An English novelist, born in London. He was educated at Marlborough and at Oxford, where he took honors in classics. He studied law and was admitted to the bar in 1887, but gave up practice in 1894. In 1897 he visited the United States. His first book was *A Man of Mark* (1890), followed in quick succession by *Father Stafford* (1891); *Mr. Witt's Widow* (1892); *Sport Royal*, a collection of short stories (1893); and *The Prisoner of Zenda* (1894). This last book, the scene of which is laid in an imaginary principality of South Germany, is a happy combination of romanticism and modernity. To the same year belong the delightful *Dolly Dialogues.* Among the successful novels are *The Chronicles of Count Antonio* (1895); *Comedies of Courtship*, and *The Heart of Princess Osra* (both 1896); *Phroso* (1897); *Simon Dale* and *Rupert of Hentzau* (both 1898); *The King's Mirror* (1899); *Quisante* (1900); and *The Intrusions of Peggy* (1902). Mr. Hawkins writes with an animation and precision of touch that are admirable, and he is also notable for a keen if superficial psychology. The *Dolly Dialogues* (reprint with four additional dialogues, 1902) contain a shower of neat epigrams and extremely clever repartees.

HAWKINS, BENJAMIN WATERHOUSE (1807-89). An English artist and author, born in London. He lived at Knowsley, the seat of the Earl of Derby, for five years, where he studied animal painting. He was assistant superintendent of the International Exhibition of 1851, and in 1852 the Crystal Palace Company employed him to make restorations of extinct animals, in which he was an expert. In 1868 he lectured in New York City and other cities of the United States, and afterwards lived in this country. He was employed by the Central Park commissioners of New York City in restoring the forms of extinct creatures, but later administrations rejected his work, much of which was destroyed. He wrote: *Elements of Form* (1842); *Comparative View of the Human and Animal Frame* (1860); *Atlas of Comparative Osteology* (with Huxley, 1865); *Artistic Anatomy of Cattle and Sheep* (1867); and *Artistic Anatomy of the Dog and Deer* (1876).

HAWKINS, DEXTER ARNOLD (1825-86). An American lawyer, born in Camden, Maine. He graduated at Bowdoin College in 1848, after which he divided his time between teaching, traveling, and studying law until 1854, when he began to practice in New York City. He lectured

and wrote on various subjects, but especially on education, which engaged his chief interest. He was largely instrumental in securing the establishment of the National Bureau of Education, and his pamphlets did much to open the eyes of the people to abuses practiced under the educational laws of New York. His publications include: *Report on Compulsory Education* (1874); *The Duty of the State to Protect the Free Common Schools by Organic Law* (1871); and *The Roman Catholic Church in New York City, and the Public Land and Public Money* (1880).

HAWKINS, Hamilton Smith (1834—). An American soldier, born in South Carolina. He graduated at the United States Military Academy in 1855, and in 1861 entered the army. In 1883 he attained the rank of major, and in 1889 was promoted to be lieutenant-colonel. In 1888 he became commandant at the United States Military Academy, in 1894 colonel, and in the same year commandant of the Fort Leavenworth school. During the Spanish-American War he commanded the division which took San Juan Hill in the second day's battle at Santiago. In 1898 he was promoted to be brigadier-general, and retired.

HAWKINS, or **HAWKYNS,** Sir John (1532-95). An English naval commander, the son of William Hawkins, a merchant and sea-captain of Plymouth, who had made several voyages to America. He was born at Plymouth. He followed the sea from an early age, and by 1561 had made several voyages as far as the Canaries. In 1562, with influential backing, he sailed from England with three ships, secured a cargo of 300 negroes on the coast of Sierra Leone, and then crossed the Atlantic to the West Indies, where he forced the Spaniards to take slaves in exchange for hides, spices, sugar, and ginger. He himself returned to England, but sent two shiploads of merchandise to Spain, where they were seized and the cargoes confiscated. This loss did not deter him from fitting out another expedition on a larger scale in 1564, in which the Earl of Pembroke and Robert Dudley, later Earl of Leicester, were among his partners, and in which Queen Elizabeth herself was interested to the extent of lending him her ship *Jesus*. With four vessels he sailed to the African coast, where his cargoes of negroes were obtained only after hard fighting. After a show of arms at Burburata, Venezuela, and at Rio de la Hacha, a 'satisfactory trade was opened,' and his negroes at length disposed of. Sailing northward, Hawkins relieved the French colony of Laudonnière, on Saint John's River, Florida, leaving them provisions and a small ship, and thence sailed homeward. The voyage was exceedingly profitable for all the partners, and Hawkins was granted a coat of arms for his skill. The protests of the Spanish were so great at this threat to their trade monopoly that it was not until 1567 that the Queen would consent to let Hawkins undertake another voyage. Then, indeed, she showed her favor so far as again to lend him the *Jesus*, quite likely becoming thereby a partner in the enterprise. On October 2d the little fleet of six ships, one of which, the *Judith*, was commanded by Francis Drake (q.v.), a kinsman of Hawkins, set sail from Plymouth. Following the course of his previous voyages, Hawkins sailed first to Sierra Leone, where about 500 negroes were obtained, and where some Portuguese merchantmen were plundered and more than 70,000 pieces of gold secured from them. Again force had to be used before the Spanish in the West Indies would trade with them. A large part of his cargo was disposed of at Rio de la Hacha, Carthagena, and other ports, and they had turned their prows toward home, when, according to Hawkins's account, a storm drove them into the harbor of San Juan de Lua (Vera Cruz) on the coast of Mexico. There, on September 17th, a day after they had entered the port, they were beset by a Spanish fleet of thirteen ships. After three days' negotiation a peaceful agreement was arrived at, and the Spanish fleet entered the harbor. The truce was short-lived, however, and on the 24th a conflict was precipitated. Hawkins defended his ships stubbornly, but the odds against him were overwhelming. The *Jesus* was disabled, and Hawkins transferred himself to the *Mission*, one of his smaller ships, in which he finally escaped to sea. The *Judith*, with Drake in command, was the only other English ship that got away from the harbor. After this disastrous voyage, Hawkins remained in England for some years, was elected to Parliament in 1572, and was made Treasurer and Comptroller of the Royal Navy, both of which offices he held for life. His practical experience as a navigator enabled him to bring about a number of important improvements in the rigging and construction of the ships of the navy; and in spite of charges of dishonesty in contract work, the navy was made more efficient than it had ever been before. In 1588 he took part as a rear-admiral in the defeat of the Spanish Armada, personally commanding the *Victory*, and winning knighthood for his bravery in action. In 1595 he accompanied Sir Francis Drake in his successful expedition to the West Indies, but died at sea off Porto Rico. He was one of the founders, with Drake, of the fund for disabled seamen known as 'the chest at Chatham,' and in 1592 built the Sir John Hawkyns Hospital at Chatham. Consult: Campbell, *Lives of the Admirals* (London, 1812-17); Southey, *Lives of the British Admirals* (London, 1833-40); *The Hawkins's Voyages*, Hakluyt Society Publications (London, 1877); and Winsor, *Narrative and Critical History of America*, vol. iii. (Boston, 1884).

HAWKINS, Sir John (1719-89). An English writer on music. He was born in London; became a lawyer, and devoted his leisure to his favorite study of music. His marriage to a wealthy woman in 1753 enabled him to indulge his passion for acquiring rare works of music, and he bought the collection formed by Dr. Pepusch, which he subsequently presented (1779) to the British Museum. On such materials he founded his celebrated work on the *General History of the Science and Practice of Music* (1776; republished 1853 and 1875), which, although badly written, contains much of historical value. Hawkins was a member of two of the small clubs which Dr. Johnson founded, though he was pronounced by the lexicographer a 'most unclubable man.' He drew Johnson's will for him and became one of his executors. Hawkins afterwards wrote a life of Johnson, which appeared with an eleven-volume edition of his works (1787-89), but was soon superseded by Boswell's biography.

HAWKINS, or **HAWKYNS,** Sir Richard (c.1562-1622). An English naval hero, only son of the more famous Sir John Hawkins (q.v.). He went to the West Indies for the first time in 1582 with an expedition commanded by his uncle, William Hawkins. In the fight against the Invincible Armada (1588) he commanded the Queen's ship *Swallow;* and in 1593 he started on a voyage around the world, which was to eclipse the achievements of all previous circumnavigators, as he meditated making a thorough investigation of the lands at which he might touch; their geography, their cities and peoples, and the prevailing conditions of trade. An account of the early part of this voyage was written by himself many years afterwards, and is therefore not to be too greatly relied upon. He touched at various places on the east coast of South America, passed through the Straits of Magellan, and then sailed northward to Valparaiso, which he captured and plundered; but on June 18, 1594, almost exactly a year after he had left England, he was attacked in the Bay of San Mateo by two Spanish ships under the command of Don Beltran de Castro, a brother-in-law of the Viceroy. The English numbered only about 75 men at this time, while the Spaniards are said to have been at least ten times as numerous. After three days of fighting, Hawkins surrendered on condition that the prisoners' lives should be spared, and that they should be sent back to England as soon as possible. In spite of this he was kept in Lima until 1597, and then sent to Spain, where he was imprisoned for a number of years. When at last released he returned to England, where he was knighted, elected a member of Parliament, and made Vice-Admiral of Devon. In 1620-21 he was vice-admiral under Sir Robert Mansell of the unsuccessful expedition against the pirates of Algiers. Consult Markham, *The Hawkins's Voyages* (London, 1878).

HAWKINSVILLE, hạ'kĭnz-vĭl. A town and the county-seat of Pulaski County, Ga., 40 miles south of Macon; on the Ocmulgee River, at the head of navigation, and on the Southern and other railroads (Map: Georgia, C 3). It is the centre of a region which ships agricultural produce, melons, lumber, naval stores, and cotton, and has a cotton-mill, cotton gins and compresses, cottonseed-oil mills, carriage and wagon shops, barrel factories, etc. Population, in 1890, 1755; in 1900, 2103.

HAWK-MOTH. A moth of the family Sphingidæ. These moths have very stout bodies and long, narrow wings. The sucking-tube is usually very long, and when not in use is coiled spirally under the head. Most of the hawk-moths are large, strong on the wing, and fly at dusk. The larger species are not infrequently called 'humming-bird moths,' because while sipping nectar they have the same poised attitude of the body as the humming-birds, maintained by a rapid wing movement. They are all beautiful moths, but in quiet hues—olive, gray, or brown being the prevailing colors, with a bit of yellow or pink in some species. The larvæ have given the name Sphinx to the type genus of the family, because of the stiff, erect poise assumed by them when disturbed. Near the posterior end of the body a dorsal horn, tubercle, or knob is usually present. About 100 North American species have been described. The most common species are the tomato-worm, and the tobacco or 'horn' worm (qq.v.). Consult Beutenmüller, "Descriptive Catalogue of the Sphingidæ Found Within Fifty Miles of New York City," in *Bulletin of the American Museum of Natural History,* vol. vii. (New York, 1898).

HAWK-OWL. (1) A large and remarkable owl (*Surnia ulula*) of the subarctic region of both continents, occasionally seen in Central Europe and the Northern United States in midwinter. It is about 16 inches long, and mottled brown in color, the American specimens being darker as a rule than those of the Old World. There are no ear-tufts, the top of the head seems flat, and the face very hawk-like; it is also hawk-like in its manner of flight, and is often seen abroad in full daylight. It feeds upon birds and small mammals, and always appears in large numbers when the lemmings become plentiful and take to migrating. It usually nests in the hollow of a broken tree-top, and defends its five to eight white eggs or young with great courage. In Alaska it is not uncommon, and destroys many ptarmigan. See Plate of Owls.

(2) Any of the owls of the genus Ninox inhabiting Southeastern Asia and Australia, and also Madagascar, often distinguished as 'Oriental hawk-owls.' Their small heads, long tails, and hard plumage give them a very falconine appearance, and the Australian species (*Ninox strenua*) reaches a length of 24 inches.

HAWKS, Francis Lister (1798-1866). An American clergyman, born at New Berne, N. C. He graduated at the University of North Carolina (Chapel Hill) in 1815; studied law under Judge William Gaston of New Berne; was admitted to the bar; and was elected from New Berne to the State Legislature. He studied theology under the direction of the Rev. W. M. Green (later Bishop of Mississippi); was ordained to the diaconate in 1827; in 1830 was elected professor of divinity in Washington College (now Trinity, Hartford, Conn.); and in 1831 was instituted rector of Saint Stephen's Church, New York City; later in 1831 he was elected to the rectorship of Saint Thomas's parish, New York City, in which office he continued until 1843. He was appointed professor of ecclesiastical history in the General Theological Seminary in 1833; in 1835 and in 1836 visited England for the purpose of making copies of documents pertaining to the early history of the Protestant Episcopal Church in America. From the eighteen large folio volumes of manuscripts he prepared two works—on Virginia (1836) and Maryland (1839) respectively. Because of criticism of these, he then withdrew from the undertaking. A school, Saint Thomas Hall, established by him at Flushing, L. I., in 1839, became involved in financial embarrassments, and failed in 1843. Upon the establishment of the University of Louisiana, he was elected its first president. In 1849 he returned to New York City as rector of the Church of the Mediator, later merged with Calvary Parish, the rectorship of which he assumed. In 1862, owing to difference of opinion between his parishioners and himself regarding the Civil War, he resigned, and until 1865 he was rector of Christ Church, Baltimore, Md. He became rector of the newly organized parish of the Holy Saviour in New York City, in 1865. He was a scholar

of high attainment, particularly in ecclesiastical history, and an eloquent preacher. The long list of works written or edited by him further includes: *Commentary on the Constitution and Canons of the Protestant Episcopal Church in the United States* (1841); *Egypt and Its Monuments* (1849); *A History of North Carolina* (1857); *Narrative of Commodore Perry's Expedition, Compiled from Perry's Original Notes and Journal* (1856); and (with W. S. Perry) *Documentary History of the Protestant Episcopal Church in the United States of America* (vols. i. and ii., 1863-64). Consult the sketch by Richardson (reprinted from the *American Quarterly Church Review* for April, 1867) in a memorial volume (New York, 1867); also the commemorative discourse by Morgan (New York, 1867).

HAWKS'BEE, Francis. The name of two English physicists. See Hauksbee.

HAWKSBILL TURTLE, or Caret. A large carnivorous sea-turtle (*Eretmochelys imbricata*), so named on account of the shape of its bill, which is a formidable weapon. Its flesh is not good food, but its eggs are sweet. The species is valuable for the plates of its shell, which overlap each other, and furnish the 'tortoise-shell' of commerce. This turtle is common in tropical seas, especially the West Indies, the South Sea Islands, and in the Indian Ocean.

HAWKSHAW, hąk'shą, Sir John (1811-91). An English civil engineer, born in Yorkshire, England. After a common-school education in Leeds, he turned to the practical study of engineering, went to Ireland in 1831 to serve under Alexander Nimmo, and in 1832 engaged in mining engineering in Venezuela. He returned in 1834, was connected with various English and German railroads, and settled in London in 1850 as a consulting engineer. His subsequent professional work was concerned with many branches of engineering, in all of which he displayed intimate knowledge and sound judgment; and he was consulted regarding almost all the great engineering projects of his time in Europe. He constructed the Charing Cross, East London, and Cannon Street railroads; a tunnel under the Severn River; the Clifton suspension bridge, the Londonderry bridge in Ireland, and the Nerbudda bridge in India; and the Amsterdam Ship Canal. He was often the Government commissioner in investigating sanitary and military matters, and was the engineer summoned to report finally upon the plans and site for the Suez Canal. In 1873 he was knighted. He became a member of the Royal Society in 1855, was president of the Institution of Civil Engineers from 1862 to 1864, was made president of the British Association in 1875, and was an honorary member of the American Society of Civil Engineers. His published works include: *Reminiscences of South America* (1838), and a large number of reports dealing with his varied professional labors.

HAWKS'LEY, Thomas (1807-93). An English civil engineer, born at Arnold, near Nottingham. He was educated at the Nottingham grammar school, and in 1822 began an apprenticeship to an architect and surveyor named Stavely, by whom he was finally admitted to partnership. His first important engineering work was the development of an increased water-supply for Nottingham in 1830. In 1847, with Lord Armstrong, he invented the well-known self-acting valve designed to close a pipe automatically when the velocity of the water reaches a certain limit. In 1852 he removed to London, where his fame and reputation grew rapidly, until he was recognized as the greatest authority on water-works engineering in England, and one of the foremost engineers in that branch in the nineteenth century. At one time or another he was engaged in some capacity, either as a consulting or constructing engineer, by almost every large city in the United Kingdom. His greatest achievements were in connection with the Sheffield water-works, the construction of the Thornton Park and Bradgate reservoirs at Leicester, the planning and construction of the Vyrnwy Valley dam and lake, for supplying water to the city of Liverpool—one of the most remarkable and important pieces of water-works engineering ever attempted. He was president of the Institute of Civil Engineers in 1872-73, president of the Institution of Mechanical Engineers in 1876-77, and was elected a fellow of the Royal Society in 1878.

HAWKS'MOOR, Nicholas (1661-1736). An English architect. He was born in Nottinghamshire, and at eighteen years of age began his professional studies under Sir Christopher Wren. Unusual aptitude in his profession procured him steady employment from the outset of his career, and under Wren's supervision he built several important structures. He became deputy surveyor at Chelsea Hospital (1682-90); clerk of the works of Greenwich Hospital in 1698, and deputy surveyor in 1705. Although at first working under the superintendence of Wren, he afterwards was associated on more equal terms with his former master and with Sir John Vanbrugh and Inigo Jones. He assisted Wren in building Saint Paul's Cathedral from 1675 to 1710, was associated with Sir John Vanbrugh at Castle Howard, Yorkshire, and also at Blenheim Palace, Oxfordshire. At Oxford he designed the library and the south quadrangle of Queen's College and also the north quadrangle (with the exception of the library) of All Souls' College. A scheme of building fifty new London churches at the close of Queen Anne's reign engaged a large share of Hawksmoor's attention. He was appointed one of the surveyors for that purpose, and designed six of the new churches, the best being that of Saint Mary Woolnoth, with a very fine interior, and Saint George's, Bloomsbury, noted for its portico. After the death of Wren in 1723, Hawksmoor was appointed surveyor-general of Westminster Abbey, and continued the works of the two western towers after his former master's designs. He also drew designs for monuments and bridges. He was not remarkable for creative genius, his chief excellence being a mastery of details and construction; but on the other hand, some of the buildings attributed to his more eminent associates, notably Sir John Vanbrugh, are believed to have been designed by him.

HAWKWEED (*Hieracium*). A genus of plants of the natural order Compositæ. The species are annual or perennial, with leafless scapes or leafy stems, one-flowered, or many-flowered; the leaves, stems, and involucres in many species are hairy. The hawkweeds are very numerous, natives of the temperate and colder

regions of the Northern Hemisphere, particularly abundant in Europe. The flowers are generally yellow. The orange hawkweed (*Hieracium aurantiacum*), a perennial, two feet high, is a native of the south of Europe, often cultivated in gardens for its rich orange flowers. It has been introduced into Canada and the New England States, where it has become one of the most troublesome weeds in grass-lands. Experiments conducted at the Vermont Experiment Station showed that it could be eradicated by salt sown at the rate of 300 pounds per acre. Every plant was killed, and the grass, a species of Festuca, was improved by the treatment. Plowing under and devoting the land to hoed crops will destroy it. There are about a dozen species, native or introduced, in the Eastern United States.

ORANGE HAWKWEED.

HAWK'WOOD, Sir John de (?-1394). An English soldier of fortune, born at Hedingham Sibil, Essex. He is reported to have fought with the Black Prince at Crécy and Poitiers, and to have been knighted by Edward III.; but by 1359 he was at the head of a body of freebooters, plundering Gascony and the northern parts of Italy. His thousand lancers, each with knight and page, came to be known as the 'White Company,' and, joined to double their number of foot soldiers, armed with stout bows of yew, they spread terror throughout Southern Europe, devastating villages, holding great noblemen for ransom, and exacting heavy toll from the clergy. After serving under the Marquis of Montferrat, the White Company went into the pay of the Pisan Republic, which was then engaged in a Florentine war. From that time onward, Hawkwood took a prominent part in the strife between the different Italian republics, fighting generally upon the side of Florence, by whom he was paid a pension. He fought both for and against Pope Gregory XI. He was endowed with an equal talent for strategy and for organization. He spent the last years of his life among the Florentines, who buried him with great pomp.

HAW'LEY, Charles B. (1858—). An American musician, born in Brookfield, Mass. He studied composition under Dudley Buck, Joseph Mosenthal, and C. B. Rutenber, and voice culture with G. J. Webb, P. A. Rivarde, and Gustav Federlein. He became bass soloist in the Calvary Episcopal Church, New York; assistant organist of Saint Thomas's; and in 1883 director of the choir at the Broadway Tabernacle. His compositions include many excellent and popular songs, and considerable church music.

HAWLEY, Gideon (1727-1807). An American missionary among the Indians. He was born in Stratford, Conn., graduated at Yale in 1749; and under the supervision of Jonathan Edwards began missionary work among the Indians at Stockbridge in 1752. Two years later he undertook a mission to the Iroquois on the Susquehanna River, but he was driven out in 1756 by the French and Indian War. The latter part of his life was passed in missionary duties among the Indian tribes at Marshpee, Mass.

HAWLEY, Joseph (1723-88). An American statesman of the Revolutionary era. He was born in Northampton, Mass., was educated at Yale, and prepared himself to be a clergyman, but turned lawyer instead. He was a delegate to the Massachusetts Congress (1774-75), and a special pleader for popular rights.

HAWLEY, Joseph Roswell (1826-1905). An American politician and legislator, born in Stewartsville, N. C. His father, a Connecticut Baptist clergyman, returned to his native State in 1837, and there the son was brought up, and imbued with anti-slavery ideas. He was educated at Hamilton College (N. Y.), where he graduated in 1847, afterwards studying law, and beginning practice at Hartford, Conn., in 1850. He immediately entered politics as a Free-Soil Democrat, became chairman of the party's State Committee, and in 1852 editor of its principal State organ, the *Charter Oak*. The movement which resulted in the founding of the Republican Party received his support, and the first meeting for its organization in Connecticut was held in his office. In the next year he abandoned the law, and became editor of the *Hartford Evening Press*, the newly established Republican paper. Twenty-four hours after President Lincoln's first call for troops, Hawley recruited the first company of volunteers raised in the State, which became Company A of the First Connecticut Regiment, with Hawley as captain. He participated in the first battle of Bull Run, after which he became lieutenant-colonel of the Seventh Connecticut Volunteers, and with it took part in the Port Royal expedition. In January, 1863, as colonel, he took his regiment to Florida, and was present at the siege of Charleston and capture of Fort Wagner. In February, 1864, he commanded a brigade in the battle of Olustee, Florida, and later in the same year saw active campaigning in Virginia, being present at the siege of Petersburg. In September, 1864, he was promoted brigadier-general of volunteers. In 1865 he served as General Terry's chief of staff, was with Sherman in the Carolina campaign, and was mustered out of service in January, 1866, with the brevet rank of major-general. In April following he was elected Governor of Connecticut. In 1867 he was defeated for reëlection, and turned his attention to journalism, purchasing

the *Hartford Courant*, and uniting it with the *Press*. He became prominent as a Republican campaign speaker, was chairman of the Republican National Convention in 1868, and chairman of the Committee on Resolutions at the Convention of 1876. In November, 1872, he was elected to fill a vacancy in Congress, and was reëlected for a full term to the Forty-third Congress, serving from 1873 to 1875. He was defeated in 1874 and 1876, but was again elected in 1878, serving from 1879 to 1881, and at the end of the term was elected to the United States Senate. He was president of the United States Centennial Committee from its organization in March, 1873, to the completion of the work of the Centennial Exposition. In 1884 he was a candidate for the Presidential nomination before the Republican National Convention. He was reëlected to the Senate in 1887, 1893, and 1899, and continued to take a prominent part in legislation, and served as chairman of the Senate Committees on the Civil Service, and on Military Affairs.

HAWORTH, hą'wērth, ADRIAN HARDY (1767-1833). An English entomologist and botanist, born at Hull. He studied law, but never practiced it. His place of abode was alternately Cottingham and Little Chelsea, and he was founder-in-chief of the Entomological Society of London, afterwards a section of the Linnæan Society, of which he was also a member. The Botanical Garden at Hull was begun under his direction, and he made collections of specimens, and wrote works upon botany and entomology, including: *Observations on the Genus Mesembryanthemum* (1794); *Prodromus Lepidopterorum Britannicorum* (1802), enumerating 793 species; the sixth volume of the *Botanist's Repository* (1803); and *Synopsis Plantarum Succulentarum* (1812), which is planned on the Linnæan system, and gives in Latin the description, habitat, date of introduction, and month of flowering of each species. A supplement to this work was issued in 1819.

HAWORTH, JOSEPH (1855-1903). An American actor, born at Providence, R. I. At the age of eighteen he became a member of a stock company in Cleveland, Ohio, where he was brought up, having already once appeared upon the stage there a year or two before with Charlotte Crampton in *Richard III*. During the season of 1882-83 he toured with John McCullough. Afterwards, for several years, he himself traveled as a star in *The Bells*, *The Leavenworth Case*, *Hamlet*, and other Shakespearean plays. In 1896-98 he supported Madame Modjeska, playing an exceedingly effective Macbeth to her Lady Macbeth. His subsequent rôles included those of John Storm in *The Christian*, Rafael in *The Ghetto*, Vinicius in Stanislaus Stange's version of *Quo Vadis*, and Cassius in Mr. Richard Mansfield's production of *Julius Cæsar*. Consult: Strang, *Famous Actors of the Day in America* (Boston, 1900); Clapp and Edgett, *Players of the Present* (New York, 1899).

HAW RIVER. A name sometimes applied to the upper course of Cape Fear River (q.v.) in North Carolina, above its confluence with Deep River, the two being regarded as the headstreams of the Cape Fear.

HAWSE (older form *halse*, from Icel. *hāls*, neck, fore part of a ship, AS. *heals*, Goth., OHG. *hals*, Ger. *Hals*, neck; ultimately connected with Lat. *collum*, neck). (1) The part of a ship in which the *hawse-pipes*, or heavy castings forming the lining for the *hawse-hole* through which the anchor cable passes, are placed. (2) The direction of the cable by which the ship is riding. (3) The cables of a ship when moored. A vessel is *athwart the hawse* of another when she or her chain is ahead of the latter and across her stem or chain, or nearly so. When a ship is moored she is said to have a clear hawse when the chains lead from the hawse-pipes to the anchors without touching each other. The hawse is *open* when the chains lead away from the bows to their respective anchors and the ship rides to both of them. If a ship lying in this position swings through 180° she will have a *cross* in her hawse, the chain leading from its pipe across the stem to the anchor which is on the other side; another swing of 180° in the same direction gives an *elbow* in the hawse; the next, a *round turn;* the next, a *round turn and an elbow;* the next, *two round turns*, etc. A ship is said to have a *foul hawse* if her hawse is neither *open* nor *clear*. When the chains are in this condition the *hawse* must be cleared by unwrapping them. To effect this a chain pendant, called the *clear hawse pendant*, is led out of one of the hawse-pipes and by means of a large hook on the end firmly secured to one of the chains, usually the lee one (i.e. the one which is hanging slack—not the one by which the ship rides). The clear hawse pendant being made fast inside the ship, the lee chain is unshackled, and by means of a *dip-rope* the end is *dipped* underneath the other and unwound from it. It is then brought into the ship and shackled to its other part again. This seems a very simple operation, but, owing to the great weight of the chain cables of large ships, and to the fact that much of the work must be done in a boat, perhaps in quite rough water, it is a very laborious and troublesome one. To avoid the necessity of it, heavy swivels, called *mooring swivels*, are frequently used. This device has two shackles attached to the lower part and two to the upper. The chains are unshackled and the inner ends attached to the upper shackles of the swivel and the other ends to its lower shackles. The ship thus moored is free to swing without fouling her chains so long as the swivel is kept in order so that it will revolve with the ship. See MOOR; MOORING-SWIVEL.

THE HAWSE-BUCKLER is an iron plate, hinged to the upper edge of the hawse-pipe on the outside of the ship, and designed to close the hawse-pipe against the admission of water when at sea. The HAWSE-HOLE is the hole in sides of the ship through which the cable passes.

THE HAWSE-PIPE. A heavy casting which forms a lining for the hawse-holes and prevents the cables from tearing the plating of the bow.

HAWSER (older forms *halser*, *haulser*, *halsier*, OF. *haulseree*, from *haulser*, *hausser*, Fr. *hausser*, It. *alzare*, to raise, from Lat. *altus*, high). A rope of manila fibre four inches or more in circumference, or a wire rope exceeding three inches in circumference. It was formerly the custom to call heavy ropes hawsers only when they were *hawser-laid;* that is, when they consisted of three *plain-laid*, three-stranded ropes laid up left-handed. Large plain-laid ropes were called tow-lines. Present practice is, however, less precise, all large ropes being commonly re-

ferred to as hawsers; and rope which was formerly called hawser-laid is now called *cable-laid.*

HAWTHORN (from AS. *haȝþorn*, Ger. *Hagedorn*, from AS. *haga*, Eng. *haw*, hedge + *þorn*, Eng. *thorn*), *Cratægus oxyacantha.* A shrub or small tree, native of Europe, Siberia, and Northern Africa, which reaches a height of 25 feet. It has roundish obovate three to five lobed deciduous leaves, and corymbs generally of white, rose-colored, or sometimes deep crimson flowers, succeeded by a small red fruit (*haw*) with yellow pulp, which, since they remain on the tree after the leaves have fallen, afford winter food to birds. Of the many varieties of hawthorn, the Glastonbury thorn—so named because supposed to have originated at Glastonbury Abbey—is remarkable for its early flowering, which in England often takes place in the middle of the winter. The common kind blossoms in May or June. The winter flowers are, however, not generally followed by fruit, and a second flowering often takes place in

HAWTHORN.

the same year. The common hawthorn is often popularly called 'may,' from the season of its flowering in England. It is also called 'whitethorn,' to distinguish it from the sloe or blackthorn. It is also sometimes employed as a stock on which to graft apples and other pome fruit. The wood is very hard, close-grained, and takes a fine polish, but is apt to warp. A fermented liquor, which is very intoxicating, is made from the fruit in many parts of France. The hawthorn is particularly valuable as a hedge-plant, for which purpose it is widely used in Great Britain, in consequence of its strong and plentiful spines, quick growth while young, its long life, and its ready adaptation to a variety of soils and especially to trimming. For this purpose it is propagated by seed. See CRATÆGUS; HEDGE.

HAW'THORNE, JULIAN (1846—). An American novelist, born in Boston, son of Nathaniel Hawthorne. He entered Harvard in 1863, but did not graduate. He studied civil engineering in America and Germany, was engineer in the New York City Dock Department under General McClellan (1870-72), spent ten years abroad, and on his return edited his father's unfinished *Dr. Grimshawe's Secret* (1883). While in Europe he wrote the novels, *Bressant* (1873); *Idolatry* (1874); *Garth* (1877); *Archibald Malmaison* (1879); *Sebastian Strome* (1880). Of many novels written after his return to America, perhaps the most noteworthy are: *Noble Blood* (1884); *John Parmlee's Curse* (1886); *The Professor's Sister* (1888); *A Fool of Nature* (1896); and *One of Those Coincidences and Other Stories* (1899). He also wrote: *Saxon Studies* (1876); *Nathaniel Hawthorne and His Wife* (1885); *Confessions and Criticisms* (1886); *American Literature* (1891); journalistic articles on the famine of 1897 in India, and on the Cuban War; and a *History of the United States* (1899).

HAWTHORNE, NATHANIEL (1804-64). An American romancer. He was born at Salem, Mass., July 4, 1804. He was of English descent, and his family had spelled their name 'Hathorne,' to which Nathaniel added the 'w.' His ancestor, William Hawthorne, had accompanied Winthrop in the *Arbella* in 1630. He settled first in Dorchester, and moved thence to Salem (1636), where he received a large grant of land. He seems to have been a man of strong and energetic will, and a Puritan of the grimmest type. John, his son, was like him in abilities and disposition, took an active part in the persecution of witches at Salem, and was a magistrate as well as a soldier. Two of the Hawthornes were privateersmen during the Revolution. The novelist's father, Nathaniel Hawthorne (1776-1808), was also a sailor and sea captain, and married Elizabeth Clark Manning, of Salem, whose ancestors had emigrated to America about 1680. They had three children, of whom Nathaniel was the second. Upon her husband's death, the mother took her children to her father's house, but of Nathaniel's boyhood we only know that he was fond of long solitary walks, and showed an hereditary longing for the sea. When he was fourteen his mother went to live with his uncle, Richard Manning, at Raymond, Cumberland Co., Maine. Nathaniel still cared more for nature than for study, hunted and roamed the woods, and jotted in his note-book impressions that show how close was his sympathy with nature, and how minute his observation. After a year here, he returned to Salem to prepare for college. He entered Bowdoin College in 1821, where he found two fellow-students who were destined to exercise much influence on his future, the poet Longfellow, and the future President, Franklin Pierce. His scholarship was good, especially in the classics. Upon his graduation (1825), he returned to Salem. Here he led a somewhat secluded life, and still indulged in long walks and in literary studies, in which he is said, at times, to have become so absorbed that food would be left for him before his locked door. He wrote much, but destroyed almost as much, for he could not satisfy his taste. *Fanshawe*, the first work of fiction that he committed to the press, was issued anonymously in 1828. His name was first attached to four "Tales," in the *Token* (1831), a holiday annual under the direction of S. G. Goodrich. They were favorably received, but hardly justly appreciated. Goodrich persuaded Hawthorne to do some hack work for an *American Magazine of Useful and Entertain-*

ing Knowledge, on which he worked also as editor (1836), at a salary of $500. For the same publisher he compiled a *Universal History*, by which he earned little. Meantime his genius had been discovered by the London *Athenæum*, which reprinted three of his most characteristic pieces, and with this encouragement Goodrich brought out in 1837 the first collection of *Twice-Told Tales*. These were generously reviewed by Longfellow, who praised the author's genius and the beauty of his style; but they were received by the public with languid appreciation.

The slight returns from literature prompted Hawthorne to accept from the Collector of the Port of Boston, George Bancroft, the historian, a post as weigher in the custom-house there, and in this office he measured coal, salt, and the like, at a salary of $1200. Salem was strongly Federalist in politics, and Hawthorne, an hereditary Democrat, owed this position less to his own abilities than to partisan policy. He performed his irksome work for two years (1839-41), but was dismissed on the advent of the Whigs to power. With a mind somewhat widened by this experience, he returned to Salem and to literature, and wrote a series of sketches of New England history for children, which he published as *Grandfather's Chair* (1841). In April of that year he was drawn to Brook Farm (q.v.). He invested $1000 in the enterprise, his savings from the custom-house, and charmed his associates by his modest manliness; but, like the Miles Coverdale of his *Blithedale Romance*, a hardly disguised picture of this experiment, he was rather a looker-on than a participant. The genius of Brook Farm was discipline through society. Hawthorne's taste was for solitude, and after a year's patient experiment he left it, married Miss Peabody, of Salem, and made a home for himself at Concord, in the house that he has made memorable by his *Mosses from an Old Manse*. Here he wrote a second part of *Grandfather's Chair* (1842), and in 1842 published a second collection of *Twice-Told Tales*. In that year he also edited the *African Journal* of his old classmate at Bowdoin, Horatio Bridge, and in the next year published two volumes of *Mosses from an Old Manse*, the fruit of his scholarly leisure. Many of these sketches, however, had first appeared in the *Democratic Review*, from whose irregular payments he derived most of his income, till it failed, much in his debt (1845). These stories include such masterpieces in miniature as: *The Celestial Railroad; The Procession of Life; Roger Malvin's Burial; Rappaccini's Daughter; The Birthmark; Young Goodman Brown; The Artist of the Beautiful*, which, with some of the *Twice-Told Tales*, notably the four *Legends of the Province House*, first represent his mature genius. But they did not afford him a living, and after four years at Concord he returned to the civil service, and accepted from the new Democratic Administration the post of surveyor of the custom-house at Salem. There his powers ripened for three years, and reached their fullest expression in *The Scarlet Letter* (1850), the first draught of which he wrote before leaving his post. He has told the story of this period in the introduction to the novel with an irony not a little resented by his fellow-citizens, to whom, indeed, he felt he owed no debt, having been, he said, "deliberately lied down" by them till he was at last removed from office.

The Scarlet Letter, as written at Salem, seemed to him so sombre that he submitted to his friend and publisher, James T. Fields, in Boston, a proposal to print with it some sketches in lighter vein, that may now be read in *The Snow Image* (1852), but Fields was so deeply impressed by the work that he persuaded Hawthorne to revise and extend it, though he was skeptical enough to have the type distributed without stereotyping. The first edition of five thousand copies was sold in two weeks. The book was immediately reset, at once reprinted in England, and on both sides of the Atlantic was received with the greatest enthusiasm. It was Hawthorne's first sustained effort, and his greatest. From this time till his death he devoted himself to writing, and found a ready market for his work. He moved in the summer of 1850 to Lenox, Mass., still eagerly seeking seclusion, save for the genial companionship of Herman Melville, who lived at Pittsfield. Here he wrote *The House of the Seven Gables* (1851), a story of subtle power. The same year brought forth the juvenile *Wonder Book*. In 1851 he left Lenox for West Newton, where he wrote *The Blithedale Romance* (1852), *The Snow Image*, and other *Twice-Told Tales* (1852); and in the spring of the next year went back to his old favorite Concord, where, with Alcott for his next-door neighbor, he wrote, by one of literature's ironies, a campaign *Life of Franklin Pierce* (1852), and also *Tanglewood Tales* (1853). He had declared that he would take no office in case of Pierce's election, but his friends made him think better of it, and he accepted from his old college mate the consulate at Liverpool.

The next seven years Hawthorne spent in Europe—five at the consulate, with little journeys to the English lakes and Scotland, two in France and Italy. A record of the English years remains in *English Note-Books* and *Our Old Home*. That of the Continent may be found in *French and Italian Note-Books*. The monumental work of this period is *The Marble Faun* (1860), published also in England under the title *Transformation*, a romance long popular, but which scarcely holds its own with the critics. When he returned to America on the eve of the Civil War, he found himself somewhat remote, both by nature and by political sympathy, from the intense passions of the period. He was, as he had ever been in public affairs, rather a looker-on than an actor. Very characteristic of his attitude is a little paper, "Chiefly About War Matters," printed in the *Atlantic Monthly* (1862), with some editorial excision and foot-notes, which, though ascribed to the editor, are Hawthorne's own. Characteristic, too, of his aloofness from the passion of the time was his dedication to the then unpopular President Pierce of *Our Old Home*. This book indeed well expressed the feeling of New England for the Old. That the English did not like the book rather enhanced the interest in it in America. This was Hawthorne's last book. *The Dolliver Romance*, begun in the *Atlantic Monthly*, was incomplete at his death, as was *Dr. Grimshawe's Secret*, first printed in 1882. *Septimius Felton* also was rescued from loose sheets and printed, not as he would have had it, in 1871. These, and even more inchoate fragments, add nothing to his fame or achievements. He did little after the spring of 1864. His health failed rapidly, and he received a shock, from which he never recovered, by the sudden death of his

friend and publisher, Ticknor, during a visit that they made together to Philadelphia. He had a premonition that his own death would be on a like journey, and so it befell. He went in May, with his friend Pierce, to the White Mountains; on the 18th they came to Plymouth, and there in his sleep Hawthorne died. He was buried in Sleepy Hollow Cemetery, Concord, on the 24th, where his body now lies, close to those of his friends Emerson and Thoreau.

Hawthorne's bearing and features were as noteworthy as his personality. His face had a romantic beauty, symmetrical, full and strong in feature, with a massive brow, and an expression that veiled power behind a poetic refinement. In manner he was shy but always self-possessed, quiet in conversation, and often silent in company. To the end, as in boyhood, he did not shun solitude, living much within himself and seeming to find no better company. The style was like the man, exquisite in its purity of diction, finely poetic, delicate, gentle; yet it had a manly gravity, that bore witness to the inherited Puritan conscience. These qualities, subtly and strangely blended, give to his style a unique literary quality, and make him one of the greatest masters of English prose, in spite of the fact that when read continuously his elaborateness is sometimes found to cloy. Turning from the man to his work, one finds the dominant note, alike of the short tales and of the novels, well described by Henry James as a "feeling for the latent romance of New England." He found the shadow and the mystery in the Puritan conscience with its oppressing sense of responsibility and ingrained sin. It is the hidden passion, the secret impulse, the double life, the weird and supernatural imaginations, religion grown fierce in the struggle and isolation of early New England, out of which his poet's fancy loved to create symbolic impersonations. In the early tales, and to the last, he preferred to explore the dark corners of the human heart rather than to describe the expression which they found in social relations. Something of this tendency could be detected in *Fanshawe*, but its quintessence is in the tales of old Massachusetts, *Goodman Brown*, the *Legends of the Province House*, or in the more whimsically humorous *Village Uncle*, and *A Rill from the Town Pump*. When he went abroad for his scenes, he carried New England with him. *Rappaccini's Daughter* has in it as little of the atmosphere of Italy during the Renaissance as *Roger Malvin's Burial;* and when we turn to the novels it is still the romance of the Puritan conscience in its self-tormenting of which we read first and supremely in *The Scarlet Letter*, with its climax of penance and demoniac triumph at Dimmesdale's shame. And that study of sin festering in darkness, shunning the antidote, and seeking vainly the anodyne, has its counterpart there in Hester Prynne, who finds in sin itself the power of a higher spiritual life; while her child is a joyous and perennially fascinating mystery. *The House of the Seven Gables* is no less characteristic, though the noonday light is here softened to a mystic glow, and we breathe a ghostly atmosphere of vicarious sorrow and atonement. *The Blithedale Romance*, too, could have been dreamed only in New England, and of *The Marble Faun*, one must say with Henry James, that Hawthorne "took with him to Italy more of the old Puritan conscience than he left behind." One feels it in Donatello, and it is in every fibre of Hilda's being. Here, as always, moral guilt, and its effect upon the individual alone with himself, is the theme on which the reader's thought is concentrated with vague yet persistent shadowings of the supernatural and weirdly fascinating revelations of the depths of human souls, around which the Italian scene throws the glamour of antiquity. Hawthorne has caught the genius of the place, the sense and the spirit of the landscape. And as we find New England in this story of Italy, so we find it in the point of view of the *Note-Books*. While he was at home he sought relief from the present in the past; when he was abroad, he viewed the new scene from the standpoint of the old, always remote from the present, and looking at English, French, and Italian society with the same detachment and aloofness that marked his attitude toward American politics and the socialistic aspirations of the Transcendentalists. He was less a moralist than a dilettante in morals, without dogmatism, without insistence, "outside of everything, an alien everywhere, an æsthetic solitary" (Henry James).

BIBLIOGRAPHY. There are *Lives* of Hawthorne by his son Julian, *Nathaniel Hawthorne and His Wife* (Boston, 1885); by Henry James, in the English Men of Letters series (London, 1880); by M. D. Conway in the Great Writers series (ib., 1890); and by Woodberry, in the American Men of Letters series (Boston, 1902). There is also an excellent *Study of Hawthorne*, by George Parsons Lathrop, his son-in-law (Boston, 1876), and editor of his *Works*, with a *Memoir* (12 vols., Boston, 1883). Interesting, too, is the *Memories of Hawthorne* (Boston, 1897), by Rose Hawthorne Lathrop. There is an analytical index to the *Works*, by Evangeline M. O'Connor (Boston, 1882).

HAW'TREY, CHARLES HENRY (1858—). An English actor-manager and playwright, born at Eton, and educated there and at Oxford. At the age of twenty-three he made his theatrical début. His plays include *The Private Secretary, Jane*, and *Mr. Martin*, the first of which was originally produced in Cambridge in 1883, and was an adaptation from Von Moser's *Der Bibliothekar*. It proved a tremendous success, and was performed 844 consecutive times. In 1884 a compromise was arranged by which William Gillette's adaptation of the same play could be produced in America. Several years ago Hawtrey got control of the Comedy and Avenue theatres in London. During the season of 1901-02 he brought his company to New York with *A Message from Mars*, which had already run for 500 performances in London.

HAXO, âk'sô', FRANÇOIS NICOLAS BENOÎT, Baron (1774-1838). A French general of engineers, born in Lorraine. He fought in the armies of the Republic, first in Germany and afterwards under the First Consul in Italy. His ability was recognized by Napoleon, who sent him to Turkey in 1807 to fortify Constantinople for the Sultan. At the end of the year he returned to Italy, and in 1808 was sent to Spain, where he took an active part in the capture of Saragossa. In 1811, as commander of engineers in the Army of Germany, he inspected the fortresses held by the French in Prussia and Poland. Many of them he strengthened, particularly those at Modlin and Danzig; and in the latter he in-

troduced casement batteries of his invention, which were later adopted for the fortresses of France. During the retreat from Moscow he received from Napoleon the brevet rank of general of division, and in June, 1813, he was made commander-in-chief of the engineers of the Imperial Guard. After the Peace of 1814 the Bourbons gave him employment, but on Napoleon's return from Elba he joined the Emperor and fought under him during the Hundred Days. Nevertheless, upon Napoleon's final overthrow, the Bourbons again received him into their service and made him inspector-general of fortifications. In the discharge of this office he worked so strenuously to modernize the fortresses of France that General Rogniat said of him: "Peace was for him more laborious than war." He proposed the method of fortifying Paris which, with some modifications, was finally adopted, and in 1832 he conducted the celebrated siege of Antwerp. He left a number of writings on military engineering and analogous subjects.

HAY (AS. *hīg*, Goth. *hawi*, OHG. *hewi*, *houwi*, Ger. *Heu;* probably connected with AS. *hēawan*, OHG. *houwan*, Ger. *hauen*, Eng. *hew*). A term applied to a considerable number of cured crops used for feeding farm animals. The most important hays are made from the various grasses (timothy, meadow fescue, meadow foxtail, brome grasses, etc.), legumes (clover, alfalfa, etc.), and cereal grains (rye, oats, and barley). The different crops should be cut for hay before they have fully ripened seed, as, generally speaking, the nutritive value increases up to this time and decreases afterwards. (See GRASSES.) While most crops will not cure unless they are cut and treated in the usual way, some grasses, for instance Buffalo grass, dry in their natural habitat without appreciable loss of nutritive material, and constitute fairly good natural hay. If the cereal grains are allowed thoroughly to ripen before cutting, and the grain separated, the material is called straw, and is not as valuable for feeding as hay. Hay is cured by exposing the cut crop to the sun and air. The processes of hay-making vary with the crop and climatic conditions. The varying nature of the crops converted into hay, the dampness or dryness of the soil, the amount of moisture in the atmosphere, and the duration and intensity of the sunlight are all factors which influence the problem. At the present time hay-making is quite generally carried on by the aid of machinery. (See REAPERS, REAPING; IMPLEMENTS, AGRICULTURAL.) Generally speaking, hay is cured in the United States by spreading on the ground. In some parts of Northern Europe, in the Mackenzie River region of Canada, and elsewhere, where the rainfall is very abundant, hay is cured on racks. During the curing process the green crops lose water, which is, perhaps, the most marked change. However, there are other changes, which are due to the action of ferments. These modify more or less the composition of the hay and aid in developing the peculiar aroma. It has been found that grass which is merely dried does not have exactly the same composition as a similar sample which has been cured as hay. Fermentation, which begins in the field, often continues after the hay is stored. As in many other chemical changes, fermentation is accompanied by the liberation of heat, and in the case of hay the temperature may rise sufficiently to cause ignition. Many fires have been caused by the spontaneous combustion of hay owing to this cause. Though frequently a single grass or other crop is planted for hay, meadows often have a number of crops growing together as grasses and clovers, and these yield what is termed mixed hay. The hay from salt marshes consists of such plants as black grass (*Juncus gerardi*), fox-grass (*Spartina patera*), branch grass (*Distichlis spicata*), flat sage (*Spartina stricta maritima*), etc. The average composition of a number of sorts of hay follows:

AVERAGE PERCENTAGE COMPOSITION OF A NUMBER OF SORTS OF HAY FROM GRASSES, LEGUMES, AND CEREAL GRAINS

KIND OF HAY	Water	Protein	Fat	Nitrogen-free extract	Crude fibre	Ash
GRASSES						
Hay from mixed grasses	15.3	7.4	2.5	42.1	27.2	5.5
Timothy	13.2	5.9	2.5	45.0	29.0	4.4
Orchard grass	9.9	8.1	2.6	41.0	32.4	6.0
Kentucky blue grass	21.2	7.8	3.9	37.8	23.0	6.3
Meadow fescue	20.0	7.0	2.7	38.6	25.9	6.8
Salt marsh hay	10.4	5.5	2.4	44.0	30.0	7.7
Rowen	16.6	11.6	3.1	39.4	22.5	6.8
CEREAL GRAINS						
Barley hay, cut in milk	15.0	8.8	2.4	44.9	24.7	4.2
Oat hay, cut in milk	15.0	9.3	2.3	39.0	29.2	5.2
Rye hay	10.6	9.3	2.5	8.7	23.6	5.3
LEGUMES						
Red clover	15.3	12.3	3.3	38.1	24.8	6.2
White clover	9.7	15.7	2.9	39.3	24.1	8.3
Crimson clover	9.6	15.2	2.8	36.6	27.2	8.6
Alfalfa	8.4	14.3	2.2	42.7	25.0	7.4
Cowpea	10.7	16.6	2.9	42.2	20.1	7.5
Soy bean	11.3	15.4	5.2	38.6	22.3	7.2
Pea-vine	15.0	13.7	2.3	37.6	24.7	6.7
Vetch	11.3	17.0	2.3	36.1	25.4	7.9
Serradella	9.2	15.2	2.6	44.2	21.6	7.2
Peanut-vines (without nuts)	7.6	10.7	4.6	42.7	23.6	10.8
Sainfoin	15.0	14.8	3.0	39.5	20.4	7.3
Alsike clover	9.7	12.8	2.9	40.7	25.6	8.3

Hay contains more nutritive material in proportion to its bulk than the green crops from which it is made. In other words, it has been concentrated by the evaporation of a large

amount of the water originally present. It contains fairly large amounts of carbohydrates, both nitrogen-free extract and crude fibre, and a considerable amount of protein. The latter constituent is especially abundant in hay from leguminous crops. The different sorts of hay are very important feeding stuffs for all classes of farm animals. They are valuable not only for the nutrients they contain, but because, like all coarse fodders, they furnish the needed bulk in the ration. In early times animals were wintered on hay alone, but experience has shown that although farm animals may be maintained without other feeding stuffs, if it is desired to produce gains in weight or abundant yield of milk, hay must be supplemented by grain or other concentrated feed.

Rowen, that is, hay made from second-growth grasses or aftermath, is especially rich in nutrients; but it is made at a time of the year when the ground is often damp, the days shorter, and the sun's heat less strong than earlier in the season. This renders the curing of rowen somewhat difficult, and the product is usually of less value for some purposes than first-crop hay. When cured under favorable conditions, aftermath hay is an excellent article for winter feeding. In Switzerland and other parts of Europe it is customary to cut the soft grasses which are often grown a number of times during the season. The resulting hay is fine, and is said to be especially relished by stock. New-made hay is laxative, and should not be fed to work-horses or to driving horses. Generally speaking, new-crop hay cannot be successfully fed until the sweating process in the mow is completed and the hay has cooled. The average coefficients of digestibility of a number of sorts of hay follow:

Average Digestibility of a Number of Kinds of Hay, Shown by the Percentages of Digested Constituents

KIND OF HAY	Dry matter	Protein	Fat	Nitrogen-free extract	Crude fibre	Ash
GRASSES						
Timothy	56.6	46.9	52.2	62.3	52.5	32.8
Timothy rowen	62.2	68.0	49.5	63.4	66.5	56.4
Orchard grass	56.6	59.5	53.8	55.4	60.4	
Pasture grass	72.6	73.4	67.3	74.2	76.1	51.8
Mixed grasses	57.1	58.5	48.5	58.7	59.7	
Salt-marsh hay	56.4	42.6	29.7	54.7	60.7	69.8
Rowen	64.4	69.1	47.4	66.2	66.6	46.6
CEREAL GRAINS						
Barley	61.2	65.2	40.5	63.3	61.7	44.8
Oat	49.3	54.2	61.9	52.0	43.5	34.6
LEGUMES						
Red clover	57.4	58.0	55.2	64.4	54.2	29.1
Red clover rowen	58.0	64.8	59.8	62.8	47.4	45.8
Alsike clover	62.3	66.1	50.2	70.7	53.5	52.2
Alfalfa	58.9	72.0	51.0	69.2	46.0	39.5
Cowpea vine	59.2	64.8	51.8	70.6	42.0	49.5

Hay is fed 'long,' i.e. whole, or 'chopped,' i.e. more or less finely cut. Where a large number of animals are fed, chopping has some advantages. If a little water is added to the chopped hay it lays the dust. Meal may be added to the moistened chopped hay. Such a ration is especially recommended for hard-worked horses which are in the stable only at night. If animals have abundant time for chewing and digesting, chopping is not very desirable. Growing pigs and breeding swine are often benefited by a reasonable allowance of steamed or boiled and chopped alfalfa or clover hay. The boiling or steaming increases the palatability of the feed, though it probably does not increase its digestibility. Cooked clover hay is often given to poultry with advantage. In general it does not pay to steam or cook hay for stock.

'Hay tea,' properly made, has been successfully used for rearing calves in place of milk. The tea should be supplemented by ground flaxseed and middlings cooked in it, or some other suitable material.

Hay is commonly stored under cover or in stacks in the open field. It is now generally baled for shipping, in which form it is conveniently handled and stored.

HAY, Francis (?-1631). A Scottish nobleman, ninth Earl of Errol, identified with attempts to reëstablish the Roman Catholic religion in his native country. He became a convert to that religion, and after succeeding to the earldom in 1585 he joined Huntly in the attempt to induce Philip II. of Spain, after the defeat of the Armada, in 1588, to fit out another expedition for the conquest of England. On discovery of his treachery, he was summoned before the Council to answer the charge of attempting to subvert the Protestant religion, and upon refusing to appear he was denounced as a rebel. The Earl's career from 1589 to 1617 was little more than a series of attempts to carry out his main design, during which he engaged in conspiracies, fomented rebellions, was tried, imprisoned, and afterwards released. The Scottish King, James (afterwards James I. of England), was unwilling to exercise extreme severity upon Errol, though he knew of his guilt, and warned him of the futility of his attempts. After an abortive rebellion, in which the Earl and Huntly were the leaders, the former was sent to prison in Edinburgh Castle for an alleged share in Bothwell's attempt to capture Falkland Palace while the King was occupying it. In 1592 he was again denounced as a rebel for alleged complicity in Spanish intrigues, but was finally ordered to choose between exile and accepting the Protestant religion. Having failed to make a choice he was declared a traitor. The Earl and Huntly rebelled in 1594, and defeated a force sent against them by the King. Soon afterwards they fled the country, but returned in 1596, and the following year Errol, having complied with the King's conditions by abjuring his religion and subscribing

to the Confession of Faith, was restored to his rights and possessions. The genuineness of his profession was, however, doubted by the Scotch Kirk, and after various unsuccessful attempts to satisfy themselves on that point, Errol was imprisoned in Dumbarton Castle, but was finally released in 1617.

HAY, George (1729-1811). A Scotch Catholic bishop and polemical writer, born in Edinburgh, where he was educated and became a surgeon's apprentice. In 1778, after the death of Bishop Grant, he became Vicar Apostolic of the Lowlands. A year later his chapel-houses were mobbed and burned and his library ruined by fanatics, who were roused by the fear that Government purposed more lenient treatment of the Catholics. Hay was influential in the reëstablishment of the Scots College at Rome, and in building a Catholic seminary at Aquhorties (1799). His most important work was *The Scripture Doctrine of Miracles* (1775). A complete edition of his works was published in five volumes at Edinburgh.

HAY, James, Earl of Carlisle (c.1575-1636). An English diplomat and favorite of James I. He was born at Pitscorthy, Fifeshire, and educated in France. James knighted him, took him to England, gave him a rich wife, Honora, heiress of Sir Edward Denny, and repeatedly paid off the debts which Hay, who was an easy-going spendthrift, was always making. In 1619, soon after his creation as Viscount Doncaster, he was sent on a mission to Bohemia, where James's son-in-law, Frederick of the Palatinate, was for a short time King. A little later we find him in France (1621-22), exerting himself unsuccessfully in an effort to make peace between Louis XIII. and the Huguenots. He was made Earl of Carlisle in 1622, and was sent back to Paris two years later to arrange a marriage between Charles and Henrietta Maria, and advised the King against promising Richelieu that there should, in event of the marriage, be any abatement of laws against Catholics. Carlisle seems to have distrusted the French alliance now as strongly as he had before desired it; and he retired from politics when it became apparent that the Court policy was for peace with France. The title of Carlisle became extinct on the death of his son James (1660). See Hay, Lucy.

HAY, John (1838—). An American statesman, author, and journalist. He was born in Salem, Ind., of Scotch ancestry, October 8, 1838; graduated at Brown University in 1858; and then studied law at Springfield, Ill., where he became acquainted with Abraham Lincoln, then the acknowledged leader of his profession and of the Republican Party in the State. He was taken into the latter's law office, and in 1861 was admitted to practice in the Supreme Court of Illinois. He accompanied President-elect Lincoln on his memorable journey to Washington, and served as his assistant private secretary until his (Lincoln's) death, with the exception of a brief interval, during which he served as adjutant and aide-de-camp to the President, and of a few months, when he served in the army under Generals Hunter and Gillmore. In the latter capacity he rose to the rank of major, and was subsequently brevetted lieutenant-colonel and colonel. After Mr. Lincoln's death, he went to Paris as secretary of legation, which position he held for three years; he then served for more than a year as secretary of legation and chargé d'affaires at Vienna, and after a short interval went in the same capacity to Madrid, where he remained for another year. From 1870 to 1875 he was an editorial writer on the New York *Tribune*, and for a short time acted as editor-in-chief of that journal. In the meantime he had married the daughter of Amasa Stone, of Cleveland, Ohio. From 1879 to 1881 he served under President Hayes as First Assistant Secretary of State. He then was again engaged in literary pursuits until March 19, 1897, when he was appointed by President McKinley Ambassador to Great Britain, to succeed Thomas F. Bayard. His service in this capacity was marked by thoroughness, skill, and tactfulness. His public addresses were models of their kind and examples of diplomatic propriety. With excellent social gifts, he made a favorable impression on English society, and did much to promote friendliness between the two nations. On September 20, 1898, he was appointed Secretary of State, to succeed William R. Day, who had just resigned. His conduct of the foreign affairs of the nation was, from the first, characterized by unusual vigor, tact, and sagacious foresight. Perhaps his greatest diplomatic achievement was the maintenance of the 'open-door' policy in China, and the consequent postponement of the threatened dismemberment of that nation. Not content with verbal assurances from the European nations, Secretary Hay demanded and secured written guarantees that the 'open door' should be maintained in China. During the British war in South Africa he used his good offices to secure the neutrality of the Continental European powers. Other notable diplomatic achievements of Secretary Hay were the settlement of the Samoan dispute, as a result of which the United States secured Tutuila, with an excellent harbor in the Pacific; the settlement of the dispute with Great Britain over the Alaska boundary, temporarily by the conclusion of a *modus vivendi* in 1898, and by treaty in 1903; the negotiation of reciprocity treaties with Argentina, France, Germany, Cuba, and the British West Indies; the negotiation of a treaty with Great Britain relative to the construction of an interoceanic canal (see Hay-Pauncefote Treaty); the negotiation of new treaties with Spain; and the negotiation of a treaty with Denmark for the cession of the Danish West India Islands.

Colonel Hay won literary distinction by *Pike County Ballads* (1871) and *Castilian Days* (1891). With John G. Nicolay he wrote an authoritative life of Lincoln, entitled *Abraham Lincoln: A History* (10 vols., 1890). A once popular anonymous novel, *The Bread-Winners* (1883), is generally attributed to him, but thus far without sufficient evidence.

HAY, John, Marquis of Tweeddale. See Tweeddale, John Hay, Marquis of.

HAY, Lucy, Countess of Carlisle (1599-1660). An English political intriguer, daughter of Henry Percy, Earl of Northumberland. At the age of eighteen, much against the will of her imprisoned father, she married James Hay (q.v.). Cartwright, Herrick, Carew, and Suckling sang of her beauty and wit. She soon gained a high place in the favor of the Queen, and did much for Strafford with her influence. When Strafford was dead she became the spy and servant of the

Parliamentary Party, which she warned of the plan to arrest the five members. In both civil wars she was intimate with the aristocratic Presbyterian Party, and intrigued in behalf of Holland. In 1649 she was arrested, imprisoned, and threatened with the rack, and was held in confinement until 1652. She died suddenly in 1660, a few months after she had renewed her intrigues. Three portraits of her by Vandyck are engraved in Lodge's *Portraits*.

HAY ASTHMA. See HAY FEVER.

HAY-BOTE, or **HEDGE-BOTE** (from *hay*, AS. *hege*, *haga*, OHG. *hag*, Ger. *Hag*, Eng. *haw*, hedge + ME. *bote*, AS. *bōt*, Goth. *bōta*, OHG. *buoza*, Ger. *Busse*, Eng. *boot*, advantage, recompense). A common-law right of a tenant for life or years to cut timber for the repair of hedges and fences. It belongs to the class of rights known as estovers. See ESTOVER.

HAY'DEN, FERDINAND VANDEVEER (1829-87). An American geologist, born in Westfield, Mass. Graduating from Oberlin College in 1850, he studied medicine at Albany, N. Y., and in 1853 commenced the series of scientific explorations which have made his name famous, by an examination of the remains of extinct animals found in the Bad Lands of Dakota. The next three years were passed in a similar exploration of the Upper Missouri, resulting in the discovery of an important collection of fossils, which was afterwards divided between the academies of science of Saint Louis and Philadelphia. Being appointed geologist of a Government expedition to the Northwest, he acted in this capacity until the outbreak of the Civil War, when he entered the Union Army as a surgeon. He rose to be chief medical officer of the Army of the Shenandoah. In 1865, and until 1872, he was professor of geology and mineralogy in the University of Pennsylvania, vacating this post on account of his duties in connection with the United States Geological Survey of the Territories, which had been placed in his charge in 1867. He made important contributions to the geological, geographical, and botanical knowledge of the Western States, mostly included in the reports of the surveys issued by the Government. He was a member of many scientific societies in both America and Europe.

HAYDN, hī'd'n, JOHANN MICHAEL (1737-1809). An Austrian musician, brother of Josef Haydn, born at Rohrau. From 1745 to 1755 he was a chorister at Saint Stephen's, Vienna, and, after studying the violin and organ, assistant organist there. In 1757 he was kapellmeister at Grosswardein, in 1762 concert-meister to Archbishop Sigismund at Salzburg, and in 1777 organist of the cathedral and of Saint Peter's Church in that city. In 1800 his property was destroyed by the French occupation of Salzburg, but his brother and friends and the Empress Marie Therese came to his assistance, and he was enabled to open a school of composition. This enterprise was very successful, among its pupils being Weber and Reicha. His best works were his oratorios, masses, cantatas, and anthems, which his brother held in the highest estimation. He published little, but his compositions embrace almost every department of music, including operas, symphonies, songs, quintets, marches, and serenades. He died at Salzburg.

HAYDN, JOSEF (1732-1809). A famous Austrian composer. He was born at Rohrau, Lower Austria, March 31, 1732. His father was a traveling wheelwright, with a natural love of music. The sweetness of the boy's voice and his correct ear for pitch were noted early. His cousin, Matthias Frankh, a schoolmaster and choirmaster in Hainburg, took the lad, whom the father had destined for the Church, to his home for musical instruction. Though treated at times with much harshness, he undoubtedly was started on his career by Frankh.

From his eighth to his eighteenth year Haydn was a pupil in the choir school of Saint Stephen's, Vienna, Kapellmeister Reuter having heard him sing in Hainburg. Though wretchedly poor and often without sufficient food, he studied diligently, and at thirteen composed a mass. When his voice broke, Reuter made his boyish prank in cutting off a fellow-pupil's queue the occasion for his dismissal. A former chorister whom he chanced to meet took him in and a kind-hearted tradesman, named Buchholz, loaned him 150 florins. Haydn not only repaid the loan, but years afterwards remembered Buchholz's granddaughter in his will. Gratitude, tolerance, and the never-failing good humor which is reflected in his music, and which even a wretched marriage could not mar, mingled in his nature.

Through Metastasio, the Italian poet and librettist, Haydn secured pupils, himself taking lessons in composition from Porpora, for which he paid by menial duties. In 1758 his circumstances changed for the better. Through Baron Fürnberg, for whom he had composed his first quartet, and Countess Thun, he was appointed musical director to Count Franz Morzin, for whose orchestra he wrote his first symphony. It was during this incumbency that he married the eldest daughter of a Viennese wigmaker, named Keller. He had loved the younger daughter, but she entered a convent, and urged by her father he married her sister instead. His wife was utterly unsympathetic and unworthy of him. She tore up his manuscripts for curl-papers and pie-forms, squandered his earnings for finery, and even selected a house to live in in anticipation of her widowhood. By an irony of fate Haydn survived her and went to live in this very house.

In 1760 he became kapellmeister to Prince Paul Anton Esterházy, and retained this position under his original patron's successors till near the time of his death. Prince Nikolaus played upon the barytone (a stringed instrument superseded by the 'cello), and for this instrument alone Haydn wrote nearly two hundred pieces. For operatic performances in the princely household he composed more than a dozen operas, and for concerts numerous symphonies, quartets, and sonatas. In 1772, at the summer seat, Esterház, he brought out the "Abschieds" (Farewell) symphony, under circumstances which are variously described. Most probably, however, the Prince had denied the orchestra leave of absence to visit their families, and they had decided to leave his service. Toward the close of the symphony one player after another extinguished his candle and left. Finally only the violin leader remained. Having played the last phrase, he too blew out his candle and departed. The music and the action of the players moved the Prince so deeply that he granted their request.

Haydn and Mozart became acquainted in 1781, and from then until Mozart's death a close and generous friendship existed between them. Beethoven (q.v.) was a pupil of Haydn's for about a year, but, despite the fact that the latter praised some of his compositions, he soon grew dissatisfied with his teacher. Hadyn's fame, however, steadily increased, and when, in December, 1791, he arrived in London under engagement to Salomon, the violinist, he was the musical lion of the season, as he was also on his second visit, in 1794. His *Salomon* symphonies were composed for his London concerts. The famous Austrian national anthem he composed in 1797, and in 1798 produced his oratorio *The Creation*, following it with *The Seasons* in 1801. His last years were ailing, and his undermined constitution could not stand the shock of the bombardment of his beloved Vienna by the French in May, 1809. After the third shot he fell into convulsions, and on May 31st he died.

Haydn was honored even during his lifetime by a monument erected near his birthplace by Count Harrach, in whose service his mother had been. He attended the unveiling on his return from his first London season. His musical output was enormous. It included over a hundred symphonies and nearly a hundred quartets. His chief service to music is that he expanded the sonata form of Philip Emanuel Bach, using it in the quartet and orchestra as well as on the piano, and thus in chamber music and in symphony was the precursor of Mozart and Beethoven. His *Seven Words on the Cross*, composed as an instrumental passion for the Cadiz Cathedral, is frequently given at church on Good Friday in his brother's (Michael Haydn's) arrangement as an oratorio.

BIBLIOGRAPHY. Pohl, *Mozart and Haydn in London* (Vienna, 1867); Townsend, *Joseph Haydn* (London, 1884); Nohl, *Life of Haydn*, translated by Upton (Chicago, 1889); Pohl, *Josef Haydn* (vol. i., Leipzig, 1875-82, completed on the death of Pohl in 1887 by Mandyczewski); Karajan, *Josef Haydn in London, 1791 und 1792* (Vienna, 1861).

HAY'DON, BENJAMIN ROBERT (1786-1846). An English historical painter. He was born at Plymouth, January 26, 1786, the son of a printer and publisher. He was educated at Plymouth, where the headmaster encouraged his sketching, and at Plympton. As an apprentice to his father he worked three years, and during this time was attacked by a malady that caused a dimness of vision, which in after life prevented his executing small pictures. In 1804 he went to London and spent two years studying, drawing from the cast by himself, attending the academy schools and the lectures on anatomy by Charles Ball. He was one of the first of the English artists to appreciate the Elgin Marbles, and it was largely through his influence that they were acquired by the nation. From his studies of them he received inspiration for the painting "Dentatus" (1809), which brought him a premium of 100 guineas at the Academy Exhibition. Although his name was proposed for election as a member of the Academy, it was not accepted, owing probably to his action in withdrawing a picture, "Romeo and Juliet," because it was not given the place of honor which it deserved. His quarrel with the Academy was further aggravated by other slights, and by letters written by himself for publication, which alienated many of his powerful friends. In 1821 he married Mary Hymans, a beautiful widow, who did much to lighten his disappointments in life.

His life was an heroic struggle against adverse circumstances, partially the fault of others, but also as a result of his unscrupulousness in money matters, vanity, and egotism. His *Journal*, consisting of twenty-six manuscript volumes, contains a vivid record of this struggle. He painted only very large historical canvases, which involved him in debt, and he was several times an inmate of the debtors' prison. During his second confinement he painted the "Mock Election," which George IV. purchased for 500 guineas.

Although his ability was not recognized by the Academy, he numbered among his admirers such men as Keats and Wordsworth, both of whom wrote sonnets to him, Sir Walter Scott, Charles Lamb, Southey, Hazlitt, and Mrs. Siddons. They especially appreciated his ambitious plans for the promotion of English art, which he inculcated in his letters, pamphlets, books, and lectures. Among his published works the best-known is his *Lectures on Design* (London, 1844-46), delivered at the Mechanics' Institute at London, and often repeated, not only in the principal cities of England, but at the University of Oxford. As a teacher he was equally successful, numbering among his pupils Sir Charles Eastlake, Charles and Thomas Landseer, William Harvey, George Lance, and William Berwick. But although his ideas on schools of design and the decoration of the Houses of Parliament were adopted, he was neglected when it came to carrying them out. He struggled through life, mostly in great poverty, and finally, overcome by the mental strain consequent on the failure of the exhibition of his last two pictures, he committed suicide in the Thames, June 22, 1846.

Haydon's drawing shows great knowledge of anatomy, although it is often defective in proportions; his color, at times rich, is not always harmonious; his conceptions are always vigorous. The works which attracted most attention during his lifetime were: "Joseph and Mary Resting on the Road to Egypt" (1806); "Dentatus" (1809); "Romeo and Juliet" (1809); "Judgment of Solomon" (1814); "Christ's Entry into Jerusalem" (1820), now in Philadelphia; "Lazarus" (1822), now in the National Gallery; "Christ Blessing Little Children;" the "Anti-Slavery Society at Freemasons' Hall" (1840), now in the National Portrait Gallery. Among his other works are "Venus and Anchises," "Alexander and Bucephalus," "Napoleon," the "Reform Banquet," "Cassandra," "Xenophon," "Eucles" (National Gallery), "The Mock Election," "Maid of Saragossa," the "Banishment of Aristides," "Nero Playing the Lyre During the Burning of Rome." His smaller works are unimportant.

Consult: Haydon's *Correspondence and Table Talk*, edited by his son, Frederick Wordsworth Haydon (London, 1876); Tom Taylor, *Life of Haydon* (London, 1883); Redgrave, *A Century of Painters of the English School* (London, 1866).

HAYDUCKS, hī'dụks. See HAIDUCKS.

HAYEL, hä-yĕl', or **HAIL,** hä-ēl'. Capital of the Sultanate of Shomer, situated in the northern part of Arabia, about 250 miles northeast of Medina (Map: Asia, D 6). It is a walled town, and a place of considerable trade. Population, 25,000.

HAYEM, â'yän', Georges (1841—). A French physician, born in Paris. He was educated at the University of Paris, where he afterwards became a professor in the faculty of medicine. He was made a physician of the Saint Antoine Hospital, and in 1886 was elected a member of the Academy of Medicine. From 1873 to 1898 he edited the *Revue des sciences médicales en France et à l'étranger*. His works include: *Des hémorragies intra-rachidiennes* (1872); *Du sang et de ses altérations anatomiques* (1889); and *Leçons de thérapeutique* (1887-93).

HAYES, hāz, Augustus Allen (1806-82). An American chemist, born at Windsor, Vt. He graduated at the Norwich Military Academy in 1823 and began the study of chemistry under Professor Dana at Dartmouth. Here he distinguished himself by his researches on the proximate constituents of American medicinal plants, and by his discovery of the organic alkaloid sanguinaria, a compound remarkable for the brilliant colors of its salts. He was for a time assistant professor of chemistry in the New Hampshire Medical College, and while there in 1827 investigated the compounds of chromium, and his paper on this subject was highly praised by Berzelius, the eminent Swedish chemist. He carried out several other interesting researches in organic chemistry, as well as on many questions in engineering. He was a contributor to the *Proceedings* of the American Academy and of the Boston Society of Natural History, the *American Journal of Science* and the *Annual of Scientific Discovery*. In 1837 his investigations into the generation of steam and the economy of fuel led to the construction of improved furnaces and boilers.

HAYES, Isaac Israel (1832-81). An American Arctic explorer, born in Chester County, Pa. He went with Captain Kane as surgeon on the second Grinnell expedition in search of Sir John Franklin (1853-55), and upon his return was fired with a desire to verify his conviction of the existence of an open polar sea. Through the influence of several scientific societies he succeeded in obtaining financial support, and set out from Boston in 1860, with two astronomers and but twelve other persons, on board the *United States*. The first winter he spent near Littleton Island, latitude 78° 18′ N., but the following spring, if his observations were correct, he reached latitude 81° 35′ N., longitude 70° 30′ W., farther north than any of his predecessors in this quarter of the Arctic regions had been. The result of his explorations was to confirm him in the opinion that an open route to the pole was practicable for steamships in summer from Cape Frazer. He made a voyage to Greenland in 1869, published *An Arctic Boat Journey* (1860); *The Open Polar Sea* (1867); *Cast Away in the Cold* (1868); and *The Land of Desolation* (1872), and was honored by medals from the geological societies of Paris and London.

HAYES, Rutherford Birchard (1822-93). The nineteenth President of the United States. He was born in Delaware, Ohio, October 4, 1822. His paternal and maternal ancestry, it is claimed, can be traced back, each to a Scottish chieftain of noble blood, and he was a descendant in the sixth generation of George Hayes, who left Scotland in 1680 and settled at Windsor, Conn. His grandfather, Rutherford Hayes, born in New Haven, Conn., in 1756, settled in Brattleboro, Vt. Here the father of the President, also named Rutherford, was born. His parents emigrated to Ohio shortly before his birth. When the boy was sixteen years old he was sent to Kenyon College, where he graduated at the head of his class in 1842. He studied law for two years in the office of Thomas Sparrow, of Columbus, and subsequently spent two years (1843-45) in the Harvard Law School. In 1845 he was admitted to the bar at Marietta, Ohio, and soon afterwards entered into practice at Fremont, the residence of his uncle Sardis Birchard, then a wealthy banker. In 1849 he removed to Cincinnati, where he soon gained a remunerative practice, and became prominent in his profession. In 1852 he married Miss Lucy W. Webb, daughter of Dr. James Webb, of Chillicothe, Ohio. In 1856 he was nominated as a candidate for judge of the Court of Common Pleas, but refused to accept the nomination, although later he served as City Solicitor. In 1861, when the Civil War broke out, he enlisted for the whole war, and on June 7th was commissioned as major of the Twenty-third Ohio, of which W. S. Rosecrans was colonel. To the regiment was assigned the duty, at Clarksburg, W. Va., of protecting the Baltimore and Ohio Railroad, and of defending the border from raids; and Major Hayes took a prominent part in various expeditions necessary for the defense of the position. He served for a time as judge-advocate of the Department of Ohio, and in August, 1862, he was promoted to the colonelcy of the Seventy-ninth Ohio, but he preferred to remain, with the rank of lieutenant-colonel, with the Twenty-third, which had been incorporated with Burnside's command in the Army of the Potomac. At South Mountain (q.v.) the Twenty-third, led by Hayes, was hotly engaged, more than a hundred of Hayes's men falling dead or wounded, and he himself being slightly wounded. There was a pause for reënforcements, when a dangerous flank movement of the enemy was discovered, and Hayes was again seen at the head of the regiment. He was finally carried, fainting with loss of blood, from the field. Upon his recovery he was promoted to the rank of brigadier-general, and placed in command of the Kanawha division, of which his old regiment formed a part. He remained at Kanawha Falls until March 15, 1863, when the division was ordered to Charleston, W. Va. After this he led in several important expeditions, notably in that which he himself organized to dispute the retreat of Morgan (q.v.) and his band after their raid through Ohio. By a quick movement he cut off Morgan's retreat and forced him to surrender. In the famous raid upon the Virginia and Tennessee Railroad, in May, 1864, he led the principal assault upon the enemy's fortifications with admirable boldness and success. He took an honorable part in the attack on Lynchburg, June 18th, covering the retreat of the Union forces under dangerous conditions with perfect success. In the campaign of the Shenandoah, under Sheridan (q.v.), his services were conspicuous and valiant. In the battle of Winchester especially he displayed great coolness and courage in the most trying circumstances. For his gallant services Hayes was brevetted major-general.

He was a Republican from the formation of the party, and had taken an active part in the

political campaign of 1860. His achievements in the war made his name popular in Ohio, and when the Republicans of the Second District felt the need of a strong candidate for Congress, he consented to accept the nomination, with the understanding that he would not take the seat unless the war should meantime be ended. When, after the close of the war, he entered Congress, he at once attracted attention by his ability. He was reëlected in 1866, but had only served through his first term when the Republicans of Ohio, in 1867, nominated him as their candidate for Governor, under the conviction that he was the only man whom they could hope to elect. He was chosen by a majority of 3000, and reëlected in 1869 by a majority of 7518. He was elected for the third time in 1875, and while occupying the place was nominated by the Republican Party as its candidate for President of the United States, William A. Wheeler being nominated for Vice-President. The nominees of the Democratic Party were Samuel J. Tilden and Thomas A. Hendricks. The contest was severe and close, and disputes arose as to the electoral votes of several States. After a period of great tension all the contested cases were decided in favor of Hayes by the Electoral Commission (q.v.), and having a majority of one electoral vote (185 to 184), he was duly inaugurated on March 4, 1877. Aside from violent partisan disputes upon the questions adjudicated by the Electoral Commission, his administration was admitted by men of all parties to have been pure and honorable. An effort was made to reduce the evil of using appointments to office as rewards for partisan services, but this policy did not meet with hearty support. The President also failed to maintain close harmony with the party leaders in his attitude toward the 'reconstructed' States, from which he aimed to withdraw the Federal troops, even against the vigorous demands of the radicals for a continuation of the military supervision. He was generally recognized as a pacificator at a time when conciliation was essential to peace. Upon all political questions save those above referred to he was in full harmony with the Republican Party, and by his courageous and unflinching exercise of the veto power prevented the adoption of measures calculated to injure the credit of the country and hinder a return to specie payments. He also, by the interposition of the same power, prevented the repeal of the laws enacted by Congress, under the express authority of the Constitution, to guard the purity of national elections. After his retirement from public office President Hayes devoted himself as a private citizen to the support of philanthropy and education. As a member of the Peabody Education Board for the promotion of education in the South, as the first president of the States Board for the instruction of freedmen, and as president of the National Prison Association, he set an example of assiduity in attendance at the meetings of the boards and of patient and far-sighted counsel on the questions brought before him. He died January 17, 1893. Consult: Wilson (editor), *The Presidents of the United States* (New York, 1894); and a campaign biography by Howard, *Life, Public Services, and Select Speeches of Rutherford B. Hayes* (Cincinnati, 1876). For an account of the administration of Hayes, see the article UNITED STATES.

HAYESINE (named in honor of the American chemist A. A. Hayes). A hydrous calcium borate found in Peru and elsewhere in South America. It is a source of boric acid and borax (q.v.). Hayesine is now generally believed to be ulexite (q.v.).

HAYEZ, ī'äts, FRANCESCO (1791-1882). An Italian genre and historical painter, born in Venice. He studied under Maggiotto at the Venice Academy, and afterwards at the Academy of Milan and under Palagi in Rome. In 1820 he was appointed professor at the Milan Academy, and became head of the romantic movement in Italian art. He is a noted and vigorous colorist. Among his works are frescoes in the Vatican and the Venice Academy, and the following pictures: "The Two Foscari" (Vienna Museum); "Thirst of the Crusaders," "The Farewells of Pietro Rossi and His Family" (1820); "The Flight of Bianca Capello" (1854, National Gallery, Berlin); "The Battle of Magenta," and a portrait of Cavour.

HAY FEVER, HAY ASTHMA, HAY COLD, ROSE COLD, or AUTUMNAL CATARRH. A nervous affection which recurs annually at about the same time of the year and lasts several weeks, characterized by a profuse flow of secretion from the nose, as well as of tears from the eyes, with frequent sneezing, general malaise, irritability, insomnia, increased perspiration, and in many cases asthma. The eyes flinch in bright light, headache occurs daily, appetite is lessened, and occasionally there is fever. In some patients the attack appears in June and lasts about a fortnight. This is termed *rose cold.* Many suffer first in July, during haying; but probably the greater number begin to suffer early in August, and are relieved only on the approach of frost in October. The cause appears to be threefold: (1) A central nervous disease, with the lesion probably in the floor of the fourth ventricle in the brain, as in spasmodic asthma. (2) Intra-nasal deformity, as a deviating septum, or distorted and chafing turbinates. (3) A special pollen of some plants, affecting some and failing to excite others; while during the whole year fine dust causes in these patients sneezing, coryza, and slight rhinitis, lasting an hour or so. Removal to the seashore or a sea voyage benefits a few patients; while a sojourn in the mountains at an altitude of 1000 feet or more benefits a greater number. Of the mountains in the eastern part of the United States the White Mountains have the greatest reputation with regard to the effect of their atmosphere upon hay-fever patients. On returning home before frost, however, the affection recurs. It is said that most hay-fever patients are people of considerable intellectual development; certainly all are neurotics. Arsenic, iodides, bromides, and acetanilid benefit some. Nasal sprays and internal administration of extract of suprarenal gland (adrenalin) are serviceable in many cases, relieving the nasal stenosis. In England and on the Continent the disease appears to be of milder type, and to run a course of only a month. A Hay Fever Association, composed of sufferers from the disease, exists in the United States, which meets every year to compare results from new remedies.

HAY'GOOD, ATTICUS GREENE (1839-96). An American clergyman of the Methodist Episcopal Church (South), born in Watkinsville, Ga. He graduated at Emory College, Georgia, in 1858,

and soon afterwards entered the ministry. When General Sherman evacuated Atlanta, he was one of the ministers sent there to gather together the scattered Methodists and rebuild the churches. Between 1870 and 1875 he edited the Sunday-school publications of the Southern branch of the Church. He was president of Emory College from 1876 to 1894, and during a part of that time was editor of the *Wesleyan Christian Advocate*. Large sums of money were placed in his hands to promote various institutions, and in 1883 he was elected general agent of the Slater fund of $1,000,000 for the education of Southern negroes. He declined an election as bishop of the Methodist Episcopal Church (South) in 1872, but accepted another election in 1890. His published works include: *Our Children; Jacknife and Brambles* (1893); and *The Monk and the Prince* (1895).

HAY'LEY, WILLIAM (1745-1820). An English poet, born at Chichester. He was educated at Eton and Trinity College, Cambridge. After some ill success as a playwright, he began the production of poetical epistles to his friends, one on *Painting* to Romney (c.1777), for example, and one on *History* (1780) to Gibbon. In *English Bards and Scotch Reviewers*, Byron impales Hayley as the author of the eminently successful poems, *The Triumphs of Temper* (1781) and *The Triumphs of Music* (1804). His prose *Life of Milton* (1794) was a more creditable performance, and through the writing of it he became an intimate friend of Cowper, for whom he was influential in obtaining a pension. Blake's illustrations enhance the value of his *Ballads Founded on Anecdotes of Animals* (1805), and on the whole Hayley was more noted as the friend of great men than for being one himself. Therefore, his *Memoirs*, published in 1823, after his death, are his most interesting contribution to English literature.

HAYM, hīm, RUDOLF (1821-1901). A German writer on philosophy and literary history, born at Grünberg, in Silesia. He studied at the universities of Halle and Berlin, and was a delegate to the National Assembly at Frankfort (1848-49). He wrote a number of biographies, among them: *W. von Humboldt* (1856); *Hegel und seine Zeit* (1857); *Arthur Schopenhauer* (1864); *Herder, nach seinem Leben und seinen Werken* (1877-85); and *Das Leben Max Dunkers* (1890). He also published *Erinnerungen aus meinem Leben* (1901), and edited *Briefe von W. von Humboldt an G. H. L. Nicolovius* (1894). Consult *Philosophische Abhandlungen dem Andenken Rudolf Hayms gewidmet von Freunden und Schülern* (1902).

HAYMARKET, THE. A former market for hay and straw in London, founded in the first half of the seventeenth century, and discontinued in 1830. On the square of the same name, occupying the site of the market, stand the Haymarket and Her Majesty's theatres. Addison wrote *The Campaign* while living there.

HAYMARKET SQUARE RIOT, THE. An occurrence at Chicago, May 4, 1886, in a square in Randolph Street, where an anarchist meeting was in progress. The attempt to disperse the gathering resulted in the killing of seven policemen and the wounding of twenty-seven others, by a bomb, thrown by an unidentified member of the mob, supposed to have been one Schnaubelt. The actual bomb-thrower was never caught, but August Spies, Adolph Fischer, George Engel, and Albert Parsons were hanged as accomplices on November 11, 1887; Samuel Fielden and Michael Schwab were sentenced to imprisonment for life, and Oscar Neebe for fifteen years; and Louis Ling escaped the gallows only by committing suicide in prison.

HAYMARKET THEATRE. One of the most famous playhouses in London. It was originally built in 1720 by John Potter, on the site of the King's Head Tavern, in the Haymarket, and leased to a French company, whence the appellation, 'the New French Theatre,' by which it was for some time known. Fielding produced his burlesque *Tom Thumb the Great* there in 1730, and in 1734 became manager. Ten years later Charles Machlin assumed its management, and was followed in 1747 by Samuel Foote. In 1776, however, Colman the elder purchased it, and it was managed by him until 1794. In 1820, under Harris's management, the theatre was abandoned and a new one was built near by, which was opened on July 4, 1821, with *The Rivals*. In 1880 it was again removed, its present site being the south end of the Haymarket, opposite Charles Street.

HAYMERLE, hī'mĕr-le, HEINRICH KARL, Baron (1828-81). An Austrian statesman, born and educated at Vienna. He took part in the students' rising in the Revolution of 1848, and narrowly escaped execution. He served in the diplomatic corps at Athens, Dresden, and Frankfort; became Ambassador to Copenhagen in 1864; took part in negotiating the Treaty of Prague (1866); and from Berlin went to Constantinople (1868) and to Athens (1869), thence to The Hague (1872), and in 1877 to the Italian Court. In the following year he took part in the Berlin Congress, and in 1879 succeeded Andrássy as Minister of Foreign Affairs. In this post, which he held till his death, he was especially active in effecting friendly relations with Italy and cementing the alliance with Germany. Consult Arneth, *Heinrich Freiherr von Haymerle* (2d ed., Berlin, 1882).

HAYNAU, hī'nou, JULIUS JAKOB, Baron (1786-1853). An Austrian general. He was the natural son of the Elector William I. of Hesse, and was born at Cassel, October 14, 1786. He entered the Austrian service in 1801, and was gradually advanced in rank, becoming colonel in 1830, major-general in 1835, and field-marshal lieutenant in 1844. During the Italian campaigns of 1848-49 he evinced great military talents, but acquired also an unenviable reputation for cruelty, especially in the repression of the insurrection at Brescia, March 31 and April 1, 1849. Haynau was engaged in the siege of Venice, when he was summoned to Hungary to command the Imperial forces in that country. He stormed Raab on June 28th, and on August 9th gained a decisive victory over the Hungarians near Temesvár. After the surrender of the Hungarian main army at Világos, he executed a number of the leading Hungarian generals. In 1850, however, after being loaded with honors, he was dismissed from public service for the intractability of his disposition. In the same year he made a tour of Europe, but so general was the hatred his acts had inspired that he was several times in great danger from mobs, and while in

London was assaulted and beaten by the infuriated draymen of Barclay's brewery. For this insult the British Government declined giving any satisfaction. In Belgium and France he was also received by the populace with strong dislike, but by the vigilance of the authorities was preserved from actual harm. He died at Vienna, March 14, 1853. Consult Schönhals, *Biographie des Feldzeugmeisters Julius Freiherrn von Haynau* (3d ed., Vienna, 1875), which seeks to vindicate him from charges of cruelty.

HAYNE, Paul Hamilton (1831-86). An American poet, born in Charleston, S. C. After the death of his parents he was reared by his uncle, Robert Y. Hayne (q.v.). He studied law after having been educated at South Carolina College, but did little practicing, because he was under no financial necessities, and because his bent was literary. When in his early twenties he edited *Russell's Magazine*, and was connected, as editor or contributor, with other Charleston and Southern publications, notably as contributor to the *Southern Literary Messenger*. He was a prominent member of the small literary coterie of which William Gilmore Simms and Henry Timrod (q.v.) were conspicuous ornaments. In 1855 a volume of his poems appeared; another followed in 1857, and a third in 1859. During the Civil War he saw active service and suffered great financial losses, among others that of his library, which was burned. From 1865 to his death, he resided at a small cottage home near Augusta, Ga., which he called Copse Hill. His health was not good, but he maintained his spirits under his various misfortunes, and won a genuine though limited reputation as a poet, in both the North and his native section. His memory is still cherished warmly in Augusta and the surrounding region. His later publications include: *Legends and Lyrics* (1872); *The Mountain of the Lovers* (1873); and his complete *Poetical Works* (1882). He also edited, with a memoir (1873), the poems of his friend, Henry Timrod, and of Dr. F. O. Ticknor (1879), and wrote memoirs of R. Y. Hayne and H. S. Legaré (1878). Hayne's poetry is the work of a genuine artist, whose qualities, however, are not salient enough to attract greatly the general reader. Although he produced many good poems, in which much of the languorous sweetness of the South may be discovered, it was not his fortune to compose, like his friend Timrod, three or four lyrics of great power and popular appeal. Nevertheless he is one of the most important of Southern writers, and deserves more attention at the hands of historians of American literature than he has hitherto received.—His son, William H. Hayne (1856—), born in Charleston, inherited some of his father's poetical ability. His publications include *Sylvan Lyrics* (1893), and many occasional verses in the magazines.

HAYNE, Robert Young (1791-1839). An American political leader, prominent as an exponent of the States' Rights view of the Federal Constitution. He was born in Saint Paul's Parish, Colleton District, S. C., on November 10, 1791; was educated in a private school at Charleston; studied law in the offices of Langdon Cheves (q.v.); was admitted to the bar at Charleston in November, 1812, and attained immediate prominence in his profession. During part of the War of 1812 he acted as a captain in the Third South Carolina Regiment. From 1814 to 1818 he was a Democratic-Republican member of the State Legislature, serving as Speaker of the House in the latter year; and from 1818 to 1822 was Attorney-General of the State. In 1823 he was elected as a States' Rights Democrat to the United States Senate, in which body he quickly became conspicuous as a pronounced strict-constructionist and an advocate of free trade and of 'States' Rights.' He vigorously opposed the tariffs of 1824 and 1828, denounced the anti-slavery programme of the Panama Congress, and in various debates upheld the view that slavery was purely a domestic institution, and as such should be wholly exempt from Federal legislation or interference. He is best known, however, for his great debate with Daniel Webster in January, 1830, arising out of the so-called 'Foote's Resolution,' but covering the important question of the relation of the States to the Federal Government. Hayne began the debate on January 19th, and Webster answered on the following day, while Hayne again spoke on the 21st, 25th, and 27th, and Webster on the 26th and 27th. In these speeches, besides attacking New England, and especially Massachusetts, for the part taken by that section in the War of 1812, he brilliantly upheld the theory that the Federal Government was in reality a compact between the various States, as such; that the Federal Government itself was a party with each of the individual States to the compact thus formed, and that any State, when convinced that that compact had been broken, could for its own protection nullify or arrest the enforcement within her borders of any law deemed to be in violation of the Constitution. He naturally supported South Carolina in her controversy with the Federal Government over the tariff measures of May, 1828, and July, 1832; was a member of the Nullification Convention which assembled at Charleston on November 19, 1832; and as chairman of the 'Committee of Twenty-one,' reported the famous Ordinance of Nullification, which was passed by the Convention on November 24th. Soon afterwards he resigned from the Senate, partly, no doubt, in order that Calhoun might take his seat in that body; and in December he was elected Governor of the State and commander-in-chief of the State forces. On the 13th he delivered his inaugural address, pledging himself to maintain at all hazards the principle of nullification, and on the 20th issued a ringing counter-proclamation to the famous proclamation issued by President Jackson on the 10th. During the whole crisis he administered the executive office with marked ability, and though firmly convinced of the correctness of the position taken by his State, he used his influence on several occasions to restrain the nullificationists from acts of violence. His term as Governor ended in December, 1834. He was Mayor (intendant) of Charleston in 1835-37, and president of the Louisville, Cincinnati and Charleston Railroad from 1836 until his death. He died at Asheville, N. C., September 24, 1839. Consult: Paul H. Hayne, *Lives of Robert Y. Hayne and Hugh Swinton Legaré* (Charleston, 1878); McDuffie, *Eulogy upon the Life and Character of the Late Robert Y. Hayne* (Charleston, 1840); and Lindsay Swift (editor), *The Great Debate Between Robert Y. Hayne, of South Carolina, and*

Daniel Webster, of Massachusetts (Boston, 1898), in the "Riverside Literature Series."

HAYNES, Henry Williamson (1831—). An American archæologist, born in Bangor, Maine, son of Nathaniel Haynes, editor of the *Eastern Republican*. He graduated at Harvard, studied law, and practiced for a few years. Then he was appointed professor of Latin, and later of Greek, in the University of Vermont, a chair from which he resigned in 1873, to make archæological researches in Europe and in Egypt. His memoirs on the Paleolithic Age in Egypt (1878) won him a medal and a diploma from the Anthropological Congress of that year in Paris, and afterwards were published in the papers of the American Academy of Arts and Sciences. Haynes was long a fellow of the American Association for the Advancement of Science, and recording secretary of the Massachusetts Historical Society.

HAYNES, John (?-1654). An English Colonial Governor in New England. He was born in Essex, but emigrated to Massachusetts with other Puritans in 1633, and the following year tried to found a colony on the Connecticut River. He tried again (1636), after he had been for two years the third Governor of Massachusetts Bay, and he ultimately succeeded, becoming the first Governor of Connecticut and one of the five framers of that Colony's Constitution. That the colonists approved his rule is evident from his reëlection as often as the law allowed. In Bancroft's *History of the United States*, vol. i., he is described as being "of a very large estate and large affections; of a heavenly mind and a spotless life; of rare sagacity and accurate but unassuming judgment; by nature tolerant, ever a friend of freedom."

HAY-PAUNCEFOTE TREATY. The name applied to the convention negotiated in 1901 by John Hay on the part of the United States, and Lord Pauncefote on the part of Great Britain, which abrogated the Clayton-Bulwer Treaty (q.v.), and declared the policy which would control the United States in the construction and maintenance of an Isthmian canal between the Atlantic and Pacific Oceans. The statement in President McKinley's annual message to Congress in 1898, that the construction of the canal had become a national necessity, led to diplomatic correspondence that resulted finally in the opening of negotiations, with the end in view of so modifying the Clayton-Bulwer Treaty that, without affecting the general policy of neutrality enunciated therein, the United States would be enabled to proceed with the canal's construction. The treaty then negotiated, and transmitted to the United States Senate by President McKinley on February 5, 1900, provided: (1) For the construction of the canal by or under the auspices of the United States Government; (2) for its neutralization on the same basis as the Suez Canal; and (3) for an invitation to other powers to join in guaranteeing such neutrality. The convention was finally ratified by the Senate on December 20, 1900; but with three amendments, the first of which provided that the restrictions contained in the second article, based on the Suez convention, should not apply to such measures as the United States might find it necessary to take for their own defense and the maintenance of public order; the second explicitly stated that the Clayton-Bulwer Treaty was thereby suspended; and the third struck out the provision in regard to the guarantee to be asked of other non-constructing powers. In its amended shape Great Britain refused to ratify the convention, and it expired by limitation on March 5, 1901. Negotiations for a new treaty were immediately started, however, by Secretary of State Hay and Lord Pauncefote; the new convention was signed by them on November 18, 1901, transmitted to the Senate by President Roosevelt on December 5th following, and ratified by that body, with but slight opposition, eleven days later. The principal differences between the first and final treaties were three in number: (1) No guarantees of the canal's neutrality were to be asked either of Great Britain or any other power; (2) the Clayton-Bulwer Treaty was specifically abrogated, although the general principle of neutrality contained therein was retained; (3) certain undefined rights of control were to be allowed to the United States in time of war, the exact nature and extent of which was not specified, but there was no requirement that the canal should be kept open and free in time of war as in time of peace, nor was there a prohibition of the erection of fortifications commanding the canal or its adjacent waters.

HAY RIVER. A river of Athabasca, Can., which rises in the Rocky Mountains, and flows northeast, emptying into the Great Slave Lake (Map: Northwest Territories, F 3). Its length is 350 miles, of which 140 are navigable. The two Alexandra Falls, averaging 900 feet wide and about 250 feet high, occur in its course.

HAYS. A city and the county-seat of Ellis County, Kan., 289 miles west of Kansas City, on Big Creek, and on the Union Pacific Railroad. It has grain-elevators, flour-mills, machine-shops, etc., and a trade in flour, grain, and live stock. Hays is the seat of the western branch of the State Normal School and of an agricultural experiment station, comprising some 2000 acres, of the State Agricultural College. Population, in 1890, 1242; in 1900, 1136.

HAYS, Isaac (1796-1879). An American physician, born in Philadelphia. He graduated at the University of Pennsylvania in 1816, studied medicine there for four years, and subsequently devoted himself largely to editorial work on medical journals. He was sole editor from 1827 to 1869 of the *American Journal of the Medical Sciences;* was the founder of the *Medical News* in 1843, and of the *Monthly Abstract of Medical Science* in 1874; was president of the Academy of Natural Sciences in Philadelphia from 1865 to 1869; and was an active member of the Philosophical Society. He was also one of the founders of the Franklin Institute, was its secretary for several years, and at the time of his death was its oldest member. He was one of the oldest members, and for a time an officer of the College of Physicians of Philadelphia; also one of the founders of the American Medical Association, and author of its code of ethics, which has been adopted by all the medical societies in the country. He edited several important works on medicine.

HAYS, William Jacob (1830-75). An American animal painter, born in New York. In order to paint animals, he visited the upper waters of the Missouri and Nova Scotia. Some of his pictures are: "The Herd in the Moor" (a herd of

buffaloes); "The Prairie-Dog Village;" "A Bison Bull at Bay;" "Prairie on Fire;" and "Herd of Caribou in Nova Scotia." Although Hays was not a colorist, his work is fresh and spirited.

HAY'TER, Sir George (1792-1871). An English historical and portrait painter, born in London. He was the pupil of his father, Charles Hayter, a miniature painter, and of the Royal Academy. Afterwards he traveled much abroad. On his return he became painter to Queen Victoria. A number of his works are official pictures painted in this capacity; they include "The Coronation of Queen Victoria." His work, executed in detail, is mannered and spiritless.

HAYTER, Harrison (1825—). An English civil engineer. He was born at Falmouth, and was educated at King's College. His first appointment was upon the construction staff of the Great Northern Railway. Among the other works with which he became associated are the Severn Tunnel, the Charing Cross and Cannon Street bridges in London, and one in India nearly a mile long; he built harbors and railways in England, and upon the Continent. His principal achievements were the canal at Amsterdam, the docks at Holyhead, and those at Buenos Ayres.

HAYTI, hā'tī. See Haiti.

HAY'WARD. The county-seat of Sawyer County, Wis., 58 miles southwest of Ashland; on the Namakagon River, and on the Chicago, Saint Paul, Minneapolis and Omaha Railroad (Map: Wisconsin, B 2). It has a public library and a United States Government Indian School. Lumbering is the most important industry. Population (town), in 1900, 2720.

HAYWARD (AS. *hæigweard*, from *haga*, OHG. *hag*, Ger. *Hag*, Eng. *haw*, hedge + *weard*, OHG. *wart*, Ger. *Wart*, guard). The name originally given in England to one who kept the common herd of cattle of a town, or of a manor, when the copyhold or other tenants had the right of sending cattle to graze. In the New England villages, particularly of Massachusetts, the name hayward was given to the keeper of the pound for strayed horses and cattle. The word is not now in general use in the United States.

HAYWARD, Abraham (1801-84). An English essayist, born at Wilton, near Salisbury. He received his education at home with a tutor, and afterwards in the fine library of the solicitor to whom he was articled. While a student at the Inner Temple, London, he attracted attention as the joint editor of a law magazine, and also as a debater in the same club with J. S. Mill, whom he wrote against in later years. As a result of two German sojourns, Hayward made an acceptable translation of Goethe's *Faust* (1833), of which a second and enlarged edition was published the following year, and he was thus introduced into the society of such men of letters as Lockhart, Macaulay, and Sydney Smith. He wrote a book upon *The Art of Dining* (1852), besides numerous treatises upon legal subjects, a travel sketch, critical essays on the authorship of the *Letters of Junius*, on the Crimean campaign, and other topics of his time. He left the Tory Party for the Whigs in 1846, but not receiving from them the preferment he considered his due, he took revenge upon his enemies with tongue and pen. However, he had many warm friends, and was a noted club man, whist-player, and contributor of biographical and political essays to the leading reviews.

HAYWARD, Sir John (c.1564-1627). An English historian. He was born and educated at or near Felixstowe, Suffolk, and graduated at Cambridge. His earliest production, *The First Part of the Life and Raigne of Henrie the IIII., Extending to the End of the First Yeare of his Raigne* (1599), placed him in the bad graces of Queen Elizabeth, who was easily persuaded that he was painting a moral for herself in his account of Richard II.'s downfall, and therefore had the historian imprisoned. Having learned policy, Hayward kept the favor of James I., dedicated books to him and his son, defended the divine right of kings, and advocated the union of England and Scotland. Among his works are: *An Answer to the First Part of a Certaine Conference Concerning Succession* (1603); *The Lives of the Three Normans, Kings of England* (1613); *The Sanctuarie of a Troubled Soule* (1616); *David's Teares* (1622-23); *Christ's Prayer Upon the Crosse for His Enemies* (1623); *Of Supremacie in Affaires of Religion* (1624-25); and *The Life and Raigne of King Edward the Sixth* (1630), published after the author's death.

HAY'WOOD, Eliza (c.1693-1756). An English novelist and dramatist, born probably in London. Her maiden name was Fowler. She married when she was young, was deserted by her husband, and about 1715 appeared in Dublin and London as an actress. Steele's *Sappho*, in the *Tatler* of April 23, 1709, is usually identified with her, but wrongly it would seem from the dates. She rewrote *The Fair Captive* (1721); composed a comedy, *A Wife to Lett* (1723), in which she acted, and a tragedy, *Frederick, Duke of Brunswick Lunenburgh* (1729); and collaborated with Hatchett in *Opera of Operas* (1733). But she is best known for her novels, which brought upon her an attack by Pope in the *Dunciad* (book ii., 157 sqq.). Mrs. Haywood and Curll replied with a *Female Dunciad*. A collected edition of her novels, not including the famous *Memoirs of a Certain Island* (1725) and *The Secret History of the Present Intrigues of the Court of Caramania* (1727), appeared in 1724.

HAY-WORM. A lepidopterous larva (*Asopia costalis*), peculiar to North America, which has the strange habit of feeding normally upon dried hay, especially clover hay, but also upon timothy and alfalfa. In large numbers it attacks the hay, both in the mow and in the stack, cutting the leaves up into chaffy pieces and webbing them together with silken threads. The hay looks moldy, is infested with excremental pellets, and is distasteful to cattle. The larva is dirty white in color, and grows to a length of about three-fourths of an inch. The adult moth is lilac brown or purple, with two bands of a lighter shade on each fore wing. Old mows should be thoroughly cleaned out before putting new hay in a barn, and infested stacks should be burned.

HAY'YUG, Judah ben David (c.950-c.1000). A Jewish grammarian. He was born at Fez, near the middle of the tenth century, went to Cordova, and became a pupil of the grammarian Menahem ben Saruk. His theory that all Hebrew stems contain three letters was an important contribution at the time to Hebrew philology and lexicography. He died in the be-

ginning of the eleventh century. His two important grammatical works are: *The Book of Verbs with Weak Letters*, and *The Book of Verbs Containing Doubled Letters*, which are intended to illustrate his theory. In addition, he prepared a monograph on *Punctuation*, setting forth the features of the Hebrew vowel system. Of a fourth grammatical work only fragments have been found. Consult Jastrow's edition of Hayyug's treatises on *Weak and Geminative Verbs in Hebrew* (Leyden, 1897).

HAZARAS, hä-zä'räz. A semi-independent and partially nomadic people, of Mongolian ancestry, in the region between Herat and Kabul, Afghanistan, into which country they are said to have come, in the fourteenth century, in the wake of the great Mongolian movement of Genghis Khan. They profess Islam, the Hazaras proper to the east being Shiites, the western Hazaras, or Aimak (i.e. 'horde'), as they are sometimes called, Sunnites. Their language has been not a little influenced by Persian.

HAZARD (OF. *hazard, hasard*, Fr. *hasard*, from Sp. *azar*, unlucky throw of dice, misfortune, ace of dice, from Ar. *al*, the + *zār*, from Pers. *zār*, die). A game of dice, formerly very popular in England, where it is played both for amusement and for purposes of gambling. In the latter respect, however, a frequent player, by his knowledge of the peculiarities of the game, has the beginner at a considerable disadvantage. The game is played with two dice. The 'main,' which is called by the 'caster,' may be either 5, 6, 7, 8, or 9. Should he (the caster) throw the number called—or, supposing 6 or 8 is the main, he throws 12—he is said to 'nick,' and thus defeats his opponent, who is styled the 'setter.' The caster loses when, for instance, he throws 2, 3, or 12, when 7 is the main; but should he throw any other numbers (for example, when 7 is the main, and he throws 4, 5, 6, 8, 9, or 10) he has a 'chance,' which permits him to continue throwing until either the 'main' or the 'chance' is thrown. The game is decided in favor of the 'caster' if the 'chance' is thrown first; and in favor of the 'setter' should the 'main' be the first thrown.

HAZ'ARD, Caroline (1856—). An American educator, born at Peacedale, R. I. She was educated privately in the United States and abroad, contributed reviews, essays, and verse to magazines, published several volumes, and in 1899 was elected president of Wellesley College (Wellesley, Mass.). Her works include *Narragansett Ballads* (1894), and *The Narragansett Friends' Meeting* (1899).

HAZARD, à'zär', Désiré. A nom-de-plume of Octave Feuillet (q.v.).

HAZ'ARD, Ebenezer (1744-1817). An American author, born in Philadelphia, and educated at Princeton. He went into the publishing business in New York in 1770, but left it five years later for a Government position, and from 1782 to 1789 was Postmaster-General. In 1791 he was once more in business—this time in Philadelphia, where he helped to establish the North American Insurance Company. Besides giving literary assistance in the compilation of two histories and a biblical translation, he published *Historical Collections* (2 vols., 1792-94), and a book about the Indians, in whose spiritual welfare Mr. Hazard took much interest. But his most valuable literary remains are the letters in the possession of the Massachusetts Historical Society.

HAZARD, Rowland Gibson (1801-88). An American manufacturer and author. He accumulated a fortune in the woolen business at Peacedale, R. I., and was for three terms a member of the State Legislature. Among his writings are: Essays on *Language: Its Connection with the Constitution and Prospects of Man* (1836); on *The Resources of the United States* (1864); and two letters addressed to John Stuart Mill, on *Causation and Freedom in Willing* (1869). His granddaughter, Caroline Hazard, has edited a collected edition of his works in four volumes.

HAZE. Any comparatively slight obscuration of distinct vision due to the opacity of any medium, such as the atmosphere, through which the object is seen. The thickest haze in the atmosphere obscures the light of the sun to such an extent that his disk is but just distinguishable from the surrounding background; any greater obscuration than this is usually spoken of as cloud. This hazy effect may be produced in several ways: (1) When the air is filled with small masses of very different densities, such as rising currents of hot air and descending currents of cold air over a heated soil. In this case the beam of light is by refraction broken up and diffused so that a hazy effect, or even complete opacity, may be produced, as in a mixture of air-bubbles and water. Such a mixture is also partly opaque to sound. The haze thus produced is ordinarily spoken of as *heat-haze*. (2) The ordinary hazy effect in the atmosphere produced by the presence of foreign particles, either solid or liquid. Minute particles of ice or water form an *aqueous haze;* all other material is included under the term *dust-haze*. The dust is raised from the ground by strong wind, by currents of hot air, and especially by volcanic eruptions; particles of salt left by the evaporation of salty water also produce dust-haze. The most delicate dust-haze is produced by myriads of shells and fragments of shells of diatoms and other microscopic forms of life living in fresh-water ponds and in marshes that are dried up at certain seasons of the year. The principal source of this dust is the interior of North Africa, whence it is carried outward in all directions, but especially westward and southward by dry Harmattan winds. A red dust-haze of a much coarser grade is carried by southerly winds from Northern Africa over into Europe, and in rare cases, as in March, 1901, this is carried to Northern Germany and England. Over India a cloud of yellowish dust-haze rises day by day higher and higher during the dry season, attaining a general level of from 2000 to 4000 feet, above which the air is comparatively clear. Dust-clouds of less extent are formed over the loess formations of China and North America. The great clouds of smoke from prairie and forest fires, as they subside, leave a hazy atmosphere due to the presence of fine particles of carbon, and it appears likely that each of these gathers to itself a special atmosphere of aqueous vapor, just as spongy platinum absorbs hydrogen. This haze occurs during Indian summer in America, and is known as the Moor-Rauch in Europe.

The finest dust-haze ordinarily produces a whitish or grayish tint in the sky; coarser particles produce buff and reddish tints. When the dust particles are exceedingly small and of regular

size, as when they are composed of a few molecules of water, so that their diameters are comparable with some wave-length of light, they produce the phenomena of selective reflection and refraction, giving to the sky its ordinary blue tint and forming glories of colored rings around the sun and moon. When they are a little larger they show the colors of thin plates, and when larger still they may by diffraction give rise to small glories and larger halos. The vapor-dust from the eruption of Krakatoa in 1883 spread over the north temperate zone, producing for a year or two magnificent sunset and sunrise tints and the Bishop's Ring, so called after its first observer, Sereno, Bishop of Honolulu. The eruption of Skaptar Jökul in 1783 furnished a similar cloud of aqueous haze and red sunsets to the greater part of Europe and North America; and the same phenomenon, although on a somewhat more restricted scale, followed the eruptions of Pelée on Martinique, and the Soufrière on Saint Vincent, in 1902. The colors due to aqueous haze have been most thoroughly investigated by Prof. Carl Barus (see his "Colors of Cloudy Condensation," *United States Weather Bulletin* No. 12). The haze produced by volcanic eruption is described most fully in the *Report of the Krakatoa Commission* (London, 1887).

HAZEBROUCK, äz'brōōk'. The capital of an arrondissement in the Department of Nord, France, on the Bourre, 37 miles southeast of Calais by rail (Map: France, J 1). It has canal communication with the Lys, and is an important railway junction of lines to Calais, Lille, Ypres, Dunkirk, and Arras. It is a well-built town, with several fine buildings, including a sixteenth-century Augustinian convent, various sections of which are used for a hospital, a linen market, college lecture-rooms, and a tobacco warehouse; the Church of Saint Eloi, dating from 1493, is noted for its openwork spire, 260 feet high. There are several educational institutions and a public library. Linen, leather, beer, salt, soap, oil, and lime are manufactured, and an active agricultural trade is carried on. It is one of the most typical of Franco-Flemish towns, where the Flemish language still lingers. Its Flemish name, signifying 'the marsh of the hares,' is derived from the marshland on which the town is built. Population, in 1901, 13,261.

HAZELNUT, Filbert, or Cobnut (AS. *hæsel*, Icel. *hasl*, OHG. *hasala*, Ger. *Hasel*, hazel; connected with Lat. *corulus*, OIr., Welsh *coll*, hazel), *Corylus*. A genus of trees and shrubs of the natural order Cupuliferæ, of which the fruit is a nut in a leafy and laciniated cup, the enlarged involucre of the female flower. The male flowers are in cylindrical catkins; the female flowers mere clusters of colored styles at the extremities of buds. The common hazel (*Corylus avellana*), Lambert's filbert (*Corylus tubulosa*), and the Constantinople hazel (*Corylus colurna*) are natives of all the temperate parts of Europe. Two species are native to the United States, the American hazel (*Corylus Americana*), and the beaked or California hazel (*Corylus rostrata*), neither of which is cultivated. Most of the cultivated varieties of the hazelnut are known by the names of cobnuts and filberts; the former generally of a roundish form, the latter characterized by the greater elongation and laciniation of the fruit-cup. The finer kinds of hazel are propagated by grafting and by layers. Hazel-plants for copses are obtained from seed. A Himalayan species of hazel (*Corylus ferox*) has a spiny fruit-cup and an excessively hard nut. Barcelona nuts are the nuts of a variety of the common hazel, kiln-dried before their exportation from Spain. This process preserves their agreeable flavor; indeed, without it the nuts could not be kept long, except in air-tight cases, a satisfactory method, without losing or exchanging this flavor for one of evident rancidity. The larva of a weevil (*Balaninus nucum*) feeds on the kernels of hazelnuts. The parent female makes a hole into the nut by means of her long snout, and there deposits an egg. Great numbers of nuts are thus destroyed.

HAZELNUT (LEAVES AND FRUIT).

Hazelnuts of improved varieties are grown to a considerable extent in the south of Europe, but only to a slight extent in America. Hazelnuts yield, on pressure, about half their weight of a bland fixed oil, often called *nut-oil*. Hazelnut oil has drying properties, and is much used by painters; it is also used by perfumers as a basis with which to mix expensive fragrant oils, and it has been employed medicinally in coughs. The wood of the hazel, although seldom large enough for the purpose of the carpenter, is very tough and flexible, and hazel rods are therefore much used for making crates, hurdles, hoops for small barrels, etc. The thicker stems of hazel are used for making charcoal, which is in demand for forges, and is much esteemed for the manufacture of gunpowder and for artists' crayons.

HAZELTINE, hā'zel-tin, Mayo Williamson (1841—). An American journalist and reviewer, born in Boston, Mass. A graduate of Harvard and post-graduate student at Oxford, England, he practiced law until 1878, when he became literary editor of the New York *Sun*. His original publications include *Chats About Books, Poets, and Novelists* (1883), but he is best and very widely known for his reviews in the New York *Sun*.

HA'ZEN, William Babcock (1830-87). An American soldier. He was born in West Hartford, Vt.; graduated at West Point in 1855, and served for a time on the frontier. In the spring of 1861 he was promoted captain in the regular

infantry; but he raised the Forty-first Regiment of Ohio Volunteers and went to the front as its colonel. He defended the Ohio border, fought in Kentucky, commanded a brigade in the movement by way of Nashville to Pittsburg Landing, won distinction at Shiloh, Corinth, and the battle of Stone River, and at Missionary Ridge captured eighteen pieces of artillery. He served through the Atlanta campaign, and commanded the Second Division of the Fifteenth Corps in Sherman's march through Georgia. He was promoted major-general of volunteers in 1864, for his services at the capture of Fort McAllister, and in the summer of 1865 he commanded the Fifteenth Army Corps. At the close of the war he was brevetted major-general, United States Army. He served on the frontier as colonel of infantry from 1865 to 1880, except during his stay in France, in the Franco-Prussian War, and at Vienna, as military attaché to the United States Legation during the Turko-Russian War. In 1880 he became chief signal officer, with the rank of brigadier-general. He did much to raise the character of the signal service, by employing expert physicists, electricians, and meteorologists, and by coöperating with State weather bureaus and scientific societies. By his efforts the present standard-time meridians were adopted. He also introduced the 'cold-wave' signals and the system of hourly weather bulletins. His publications include: *The School and the Army in Germany and France, with a Diary of Siege Life at Versailles* (1872); *Our Barren Lands* (1875); and *A Narrative of Military Service* (1885).

HA'ZLETON. A city in Luzerne County, Pa., 104 miles northwest of Philadelphia; on the Lehigh Valley, and other railroads (Map: Pennsylvania, E 3). It has a picturesque site at an elevation of 1700 feet, and enjoys some popularity as a summer resort. It is the seat of a State hospital for miners, and has a park. Hazleton is the centre of the anthracite coal district, and is extensively interested in coal-mining. Its silk-mills have become of considerable importance, and there are also knitting-mills, cornice-works, and coffin and casket factories. Settled in 1820, Hazleton was incorporated as a borough in 1840, and in 1890 was chartered as a city. The government is administered by a mayor, elected every three years, and a bicameral council. Most of the subordinate officials are chosen by the executive with the consent of the council, or elected by the council. Town meetings are held frequently on matters of political and general public interest. Population, in 1890, 11,872; in 1900, 14,230.

HAZLITT, häz'lit, WILLIAM (1778-1830). A distinguished English critic and essayist. He was born at Maidstone, in Kent, April 10, 1778, where his father was then a Presbyterian minister, though afterwards a Unitarian. The latter went to America when Hazlitt was five years old, but returned three years later and settled at Wem, in Shropshire. The son was at first privately educated, and then sent to the Unitarian College at Hackney. He did not take kindly to Dissenting theology, and, after leaving college in 1795, spent the next few years at his father's house, dabbling in metaphysics and painting. His intellectual life, on the one hand, was keenly stimulated by his meeting with Coleridge in 1798, and by hearing the last sermon preached by the philosopher, which profoundly impressed him. His artistic tastes, on the other hand, led him to Paris in the winter of 1802. He spent his time there copying pictures in the Louvre, and, returning to London, took up the profession of portrait-painting. He attained no great success in this, but it brought him into literary and artistic society, of which on the latter side his *Conversations with Northcote* (1830), though belonging to a later period, are the best memorial, while on the former the association with Lamb, Hunt, and Godwin brought out the taste for pure literature, in which he was to win the triumphs denied him in the two fields of his earlier predilection. His grave *Essay on the Principles of Human Action* (1805), though his own favorite work, did not please the public. In 1808 he married, and settled at Winterslow, near Salisbury; but neither he nor his wife seems to have been well adapted for domestic life in the country. "Never, I suppose," writes his grandson, "was there a worse-assorted pair." The divorce, however, which finally separated them did not come until 1822. In 1812 Hazlitt came back to London, where at first he was Parliamentary reporter and dramatic critic for the *Morning Chronicle*. Presently, however, he found the line that suited him, and began to pour forth the remarkable series of literary criticisms on which his highest fame rests. With Leigh Hunt he tried in the *Examiner*, in 1815, to revive the glories of the *Spectator* and the *Tatler;* the best of the essays thus produced were published in 1817 under the title of *The Round Table*. Of high significance, also, are *Characters of Shakespeare's Plays* (1817); *A Review of the English Stage* (1818); *Lectures on the English Comic Writers* (1819); and *Lectures on the Dramatic Literature of the Reign of Queen Elizabeth* (1821). Coming at a time when Coleridge had just begun really to make people see what was in Shakespeare, and aiding Lamb and Hunt to recall to the memories of Englishmen the glories of their half-forgotten golden age, his criticism was of the highest importance; and he joined with the two last named in establishing an easy, flowing, familiar style of prose which was to have great results throughout the remainder of the century. Saintsbury has recently said unhesitatingly that "long before Sainte-Beuve, Hazlitt had shown a genius for real criticism, as distinguished from barren formula-making, which no critic has since surpassed;" and Stevenson, the most charming practitioner in the same prose style, takes his leave of him with, "though we are mighty fine fellows nowadays, we cannot write like Hazlitt." He and his group show in criticism the effects of the Romantic movement—a widening of the judgment, an importation of human sympathy and the personal equation, and a combination of philosophic discussion of life with bookish details. His temperament was uneven and self-tormenting; it estranged him more or less from all his friends, even for a time from Lamb. One of the most curious episodes in his career is the romantic passion which he conceived for a very ordinary girl, Sarah Walker by name, of a menial station and no attractions that others could see; Hazlitt recorded his emotions during its progress in a little book of extreme interest as a psychological document, called *Liber Amoris, or the New Pyg-*

malion (1823; new ed. New York, 1902). Soon after his divorce, he married a widow, apparently on a sudden impulse, but after a year's travel on the Continent they, too, separated. The most important literary works of his later life are: *Table Talk* (1821); *The Spirit of the Age* (1825); *The Plain Speaker* (1826); and *Sketches and Essays* (1829). His *Life of Napoleon*, of whom he was an ardent admirer, was neither a literary nor a financial success. Disappointed and harassed by anxieties, he died on September 18, 1830, with Charles Lamb at his bedside; his last words, despite all that he had suffered, were, "Well, I've had a happy life." Consult: W. C. Hazlitt, *Memoirs* (London, 1867); an excellent volume of selections in the Cavendish Library (ib., 1889), with introduction by A. Ireland, who has also compiled a *List of the Writings of Hazlitt and Hunt* (ib., 1868); his *Life* by A. Birrell, in the "English Men of Letters Series" (ib., 1902); also essays by Saintsbury in *Essays in English Literature, 1780-1860*, 1st series (ib., 1890), and by Leslie Stephen in *Hours in a Library*, 2d series (ib., 1877). A complete edition of his works, in 12 vols., was published in 1902, with an introduction by W. E. Henley.

HAZLITT, William (1811-93). An English writer, son of the essayist. He became a lawyer and was appointed registrar of the Court of Bankruptcy in London in 1854. He edited the writings of his father, and made translations of some of the works of Guizot, Thierry, Huc, and others. He also reëdited *Johnson's Lives of the Poets*, and assisted in compiling a *Manual of Maritime Warfare*. Consult W. C. Hazlitt (his son), *Four Generations of a Literary Family* (London, 1897).

HAZLITT, William Carew (1834—). An English man of letters, grandson of the essayist. He was born in London, studied law and civil engineering; but became a journalist, and finally devoted himself to literature, including bibliography, history, archæology, and numismatics. His works include: a *History of the Venetian Republic* (4 vols., 1860); *Memoirs of William Hazlitt* (2 vols., 1867); *Poems* (1877); *Offspring of Thought and Solitude*, essays (1884); *The Livery Companies of London* (1892); *Coins of Europe* (1893-97); *Coin Collector* (1896); *Four Generations of a Literary Family* (2 vols., 1897); *The Lambs: Their Lives, Their Friends, and Their Correspondence* (1897); and *Lamb and Hazlitt* (1899). He also edited a large variety of dramatic and poetical works, such as *Dodsley's Old Plays* (15 vols., 1874-76), and *Shakespeare's Library* (5 vols.); has edited *Lamb's Letters* (1886), and a number of volumes of *Bibliographical Collections and Notes* (1867-92).

HEAD. See Skull; Nervous System.

HEAD, Barclay Vincent (1844—). An English numismatist, born at Ipswich, and educated there at Saint Elizabeth's School. He was made assistant in the British Museum in 1864, and in 1893 keeper of the department of coins and medals. He became a member of the Imperial German Archæological Institute, a *lauréat* of the French Institute, and joint editor of the *Numismatic Chronicle*. He wrote: a history of Greek coinage, in single volumes (1874-1901); a *Guide to the Coins of the Ancients* (1881); *The Young Collector's Handbook of Greek and Roman Coins* (1883); the very valuable manual, *Historia Numorum* (1887); and *A Guide to the Principal Gold and Silver Coins of the Ancients in the British Museum* (4th ed. 1895).

HEAD, Sir Edmund Walker (1805-68). An English Governor-General of Canada. He was born near Maidstone, Kent, was educated at Winchester and Oxford, and was a fellow at Merton College (1830-37), a University examiner, and a law student. Succeeding to his father's title in 1838, he was a Poor-Law Commissioner in 1841, went to New Brunswick six years later as Lieutenant-Governor, and from 1854 to 1861 was Governor-General of Canada. By that time the different provinces controlled their own affairs, so that the personal character of the Governor was a matter of small moment; but during Sir Edmund's term of office the clergy reserves and seigneurial tenures were abolished, the Victoria Bridge at Montreal was built, and Ottawa was chosen by the Queen as capital of Canada. After his return to England he was made a civil-service commissioner. He published a *Handbook of Painting of the German, Dutch, Spanish, and French Schools* (1848); *The Temple of Serapis at Pozzuoli* (1858); *Viga Glum*, a translation of an Iceland story (1866). His poetical contributions to *Fraser's Magazine* were published posthumously in 1868.

HEAD, Sir Francis Bond (1793-1875). An English colonial Governor and author, of Portuguese-Jewish descent. He was born at the Hermitage, Higham, Kent, and was educated at Rochester and in the Woolwich Military Academy, where he was made first lieutenant of engineers in 1811. He saw service on the Continent, and was at the battle of Waterloo, but retired on half pay in 1825, when he went to South America to prospect in gold and silver mines. His first work recounted his experiences under the title, *Rough Notes of a Journey in the Pampas and Andes* (1828), and the rapidity of his traveling gained him the nickname 'Galloping Head.' In 1835-37 he was Lieutenant-Governor of Upper Canada. Knowing nothing of the political situation of the country, he opposed the union of the provinces, and assumed that a popular desire for responsible government merely indicated a desire for annexation to the United States. He fancied he could govern without the aid of his council, and through his bad judgment and want of tact seems to have been largely to blame for the Upper Canadian share in the rebellion of 1837. He was made a baronet in 1837. Among his published works are: *Life of James Bruce* (1830); *Bubbles from the Brunnen of Nassau* (1833); *The Emigrant* (1846); *Stokers and Pokers* (1849); *Defenceless State of Great Britain* (1850); *Fagot of French Sticks* (1852); *The Horse and His Rider* (1860); *The Royal Engineer* (1869); *Sketch of the Life of Sir J. M. Burgoyne* (1872).

HEAD, Sir George (1782-1855). An English traveler, elder brother of Sir Francis Bond Head. He was born in Higham Parish, Kent, was educated at the Charterhouse School, and went to the Peninsular War as a commissary clerk, rising gradually to be next to the head of the commissariat in 1814. This experience provided material for his *Memoirs of an Assistant Commissary-General* (1837), while from his five years' service in Halifax he gleaned *Forest Scen-*

ery and Incidents in the Wilds of North America (1829). William IV. knighted him (1831), and Queen Victoria made him her deputy knight-marshal. He was best known as the author of *A Home Tour Through the Manufacturing Districts of England*, and *A Home Tour Through Various Parts of the United Kingdom*, reprinted, in one volume, in 1840.

HEADACHE, medically termed CEPHALALGIA. A pain in any part of the head except the face. It is a symptom of heat-stroke, cerebral apoplexy, eye-strain, nasal disease, middle-ear or internal-ear disease, uterine disease, neurasthenia, etc. Treatment of headache as a disease, or by the use of 'headache powders' so commonly sold, is therefore ridiculous. The most severe headaches are those accompanying meningitis or brain diseases, tumor of the brain usually causing great suffering; these are generally brow or vertex headaches. Many fevers, such as typhoid, have a severe general headache as a symptom. Sufferers from Bright's disease have daily frontal headache in many instances. Eye-strain and gastric dyspepsia cause headache referred to the brows. The headache of constipation or of caries of front teeth is generally experienced over the brows and temples; that of anæmia, or bladder disease, or endometritis, at the vertex; that of carious back teeth, eye-strain, and middle-ear disease, at the temple as well as at the mastoid cells behind the ear; that of neurasthenia generally at the base of the occiput, though also at the brow; while derangement of the liver causes pain which may be felt over the whole occiput. Syphilis and malaria are also causes of headache of irregular distribution. Migraine (q.v.) is a headache affecting one side of the head and accompanied by nausea and vomiting and other symptoms, and is due to nerve fag, gout, indigestion, or eye-strain, or malaria in people of nervous diathesis. Gout is a frequent cause of headache, as is also alcoholic indulgence. Domestic treatment of headache should begin with copious draughts of water and a cathartic, with rest in the recumbent position in the dark, and abstinence from food for a few hours. Drugs, especially narcotics, should be taken only upon a physician's advice after study of the sufferer's environment, vocation, diet, and physical condition. Frequent use of strong alleviatives is often undermining and damaging. Among the drugs used are aconite, belladonna, antipyrin, acetanilid, codeia, morphia, phenacetin, bromides, chloral, cannabis indica, ergot, ichthyol, apiol, mineral acids, creosote, salol, salicylic acid, iodides, strychnine, nitroglycerin, quinine, alkalies, digestants, and cathartics.

HEADDRESS. Among sociological badges, the headdress is of great interest. At first view its importance is not apparent, but its connections with the advancement of humanity are numerous and varied. As distinguished from the clothing of the body, which may arise from the desire for ornament, for comfort, or for protection, the headdress was a distinctive mark, representing the organization of groups of men in primitive times. The sexes also were thus discriminated. This feature has persisted to this day, though it is now giving way before the unifying powers at work on the race.

In the study of headdresses there must be taken into consideration the varieties of natural head-covering, which determine the extent of the use of the artificial headdress, the environment regulating the materials and the need of protecting the head from cold, heat, rain, etc. To these must be added the degree and course of the advancement of the peoples, their religious beliefs and customs, and in greatest measure the æsthetic sense which pervades and modifies all these classes. It will be seen that the treatment of the headdress of different peoples requires the closest attention to these details, which render it one of the most difficult and elusive subjects connected with the study of man.

As Deniker remarks, the nature of the hair in the different divisions of mankind furnishes the broad groundwork for headdress. People with woolly hair, as the negroes, arrange it in the most complicated fashion. Smooth-haired peoples allow it to flow behind, as the Malays and some Americans, or gather it in plaits, whorls, chignons, rolls, as among the Eskimo, Koreans, Japanese, Chinese. The fuzzy-haired peoples of North Africa and Melanesia reach the acme with their great mops fantastically arranged. Following the almost instinctive desire of the human race to improve on nature, to alter and make distinctive the hair, we have dyeing, plastering with clay or oils, and the wearing of wigs practiced by many tribes. On the other hand, among lower tribes, as the Australians and Veddahs, little attention is paid to the hair, which remains in its primitive luxuriance and untidiness. To the hair are also attached feathers, flowers, etc., often as ornaments, but most frequently as a badge or token, familiar in the plumes of the North American Indians.

Perhaps the most primitive headdress, well nigh universal among smooth-haired peoples, is the fillet, originating in the need of securing the hair, and by its material, color, and other characters serving as a badge. The fillet thus appears to be the ancestor of all hats. The ancient Chinese, as well as the Greeks, were fillet-makers, and the custom survives in the present, while many people have discarded the custom within recent times. The turban is a development of the fillet. From the fillet most headdresses arose by additions horizontally or vertically, the structure remaining crownless for a long period. Witness the well-known intolerance of open-air peoples for that feature. It is probable that devices for holding the feather or bunch of feathers in the hair may have developed certain types of headdress. The types of headdress in most instances, instead of being the result of caprice or fashion, as the word is understood at present, have each an extended history. Petrie found recently in Egypt a specimen of headgear similar in style to the present Panama hat, dating about one century before the Christian Era. The history of this hat may, in geographical terms, be expressed thus: Egypt, Morocco, Spain, the New World, a line of the migration of customs and costumes that will answer for many transplantings in the Western Hemisphere. The more important of man's activities that have distinctive classes of headdress are the chase, war, rank, social position, and religious ceremony. Protection may also be mentioned as more particularly an outgrowth of environment, the ears rather than the head being covered from both heat and cold. The headdress of hunting tribes embraces features connected with stalking of

game and fetishism, as well as the shading of the eyes and of the head.

The headgear of war, originally designed to strike terror into the enemy, as well as to show rank, is represented by the helmet. A much wider range of headdress marks rank and social position. This class has its highest development in the Orient, as in Eastern Turkestan and Korea, for instance, where the headdress of each individual is an index of his standing. In ceremony the most extensive and interesting phase of this subject is presented. We have here repeated the ranks from priest-king, through priest to worshiper, the head-covering for different ceremonies, and as belonging to the hosts of spiritual beings. With this also are connected the class of masks, which are largely, if not entirely, to be taken as headdresses. It will be found that each of the divisions presented has its own ceremonial headdresses, as in the chase the Aleut hunter wears a large visor covered with ivory representations of game animals.

HEAD-HUNTING. See DYAK.

HEADLEY, hĕd'lĭ, JOEL TYLER (1813-97). An American historical writer. He was born in Walton, N. Y.; graduated at Union College in 1839; studied at the Auburn Theological Seminary; and was for a time pastor of a church in Stockbridge, Mass. His health soon failing, he traveled in Europe, and then joined the editorial staff of the New York *Tribune*. Soon, however, he was compelled to spend a considerable portion of every year in the Adirondacks for his health. His newspaper letters on the region, afterwards published as *The Adirondacks, or Life in the Woods* (1849), are said to have been the first to attract attention to that region as a health resort. Among his works are: *Napoleon and His Marshals* (2 vols., 1846); *Washington and His Generals* (1847); *Life of Cromwell* (1848); *Life of Washington* (1857) which was at one time exceedingly popular; *Chaplains of the Revolution* (1861); *The Great Rebellion* (2 vols., 1864); *Grant and Sherman: Their Campaigns and Generals* (1865); *Farragut and Our Naval Commanders* (1867); and *The Achievements of Stanley and Other African Explorers* (1877).

HEADLEY, PHINEAS CAMP (1819-1903). An American clergyman and biographer, born in Walton, N. Y. He was admitted to the bar before studying for the ministry at Auburn Seminary. In 1850 he published *Historical and Descriptive Sketches of the Women of the Bible*, and his other publications include: *Empress Josephine* (1851); *Kossuth* (1852); *Lafayette* (1853); *Ericsson* (1863); *General Sheridan* and *Admiral Farragut* (1864); *General Sherman* (1865); *General Grant* (1866); and *Public Men of To-day* (1882), besides contributions to periodical literature and books suitable for Sunday schools, such as *Half-Hours in Bible Lands* (1867).

HEADLONG HALL. A satirical novel, interspersed with lyrics, by Thomas Love Peacock, published in 1816.

HEAD-MONEY TAX. The term applied to a tax levied by an act of Congress, passed in August, 1882, which provided that there should be collected "a duty of fifty cents for each and every passenger, not a citizen of the United States, who shall come by steam or sail vessel from a foreign port to any port within the United States. . . . The money thus collected shall be paid in to the United States Treasury, and shall constitute a fund to be called the Immigrant Fund, and shall be used, under the direction of the Secretary of the Treasury, to defray the expense of regulating immigration under this act, and for the care of immigrants arriving in the United States," etc. This act of Congress is similar in its essential features to statutes enacted by many States of the Union for the protection of their own citizens, and for the good of the immigrants who land at seaports within their borders. A statute of New York covering this ground was, however, held void as infringing upon the ground of national legislation (92 U. S. Rep., p. 259, and 107 U. S. Rep., p. 59). The questions arising under the act of Congress were considered by the Supreme Court of the United States in what were called the Head-Money cases (112 U. S. Rep., p. 580), and the act was held valid. In 1894 the tax was increased to $1 per head. See IMMIGRATION.

HEADSMAN, THE. A novel by J. Fenimore Cooper (1833), the story of the hereditary executioner of Berne, in the course of which scenes in Switzerland and Italy are introduced.

HEADSTONE, BRADLEY. A schoolmaster in Dickens's *Our Mutual Friend*, with the physique of a giant and the sensitiveness of a child. As the teacher of young Hexam, he meets Lizzie, falls in love with her, and attempts to murder Wrayburn, her lackadaisical sweetheart, through jealousy.

HEALD. See HEDDLE.

HEA'LEY, GEORGE PETER ALEXANDER (1808-94). An American historical and portrait painter. He was born at Boston, July 15, 1808, and studied in Paris under Gros and Couture. At the Paris Salon in 1840 he received the third-class medal, and at the Exposition of 1855 the second-class medal. He returned to the United States in 1858, going to Chicago, where he resided until 1867. After this he went to Rome, and in 1885 he opened a studio in Paris, where the last years of his life were spent. He died at Chicago, June 24, 1894.

Healey is one of the best American portrait painters of the French school; his style is vigorous, but his color is not good. His chief historical works are: "Franklin Urging the Claims of the American Colonies Before Louis XVI." (1855); "Webster's Reply to Hayne," Faneuil Hall, Boston, containing 130 portraits. Some of the best-known portraits are: M. Guyot (1841, Smithsonian Institution); Pius IX. (1871); Louis Philippe, General Grant (1878); Webster, Clay, Calhoun; Presidents Quincy Adams, Jackson, Van Buren, Tyler, Taylor, Fillmore, Pierce, Polk, Buchanan, and Lincoln, all in Corcoran Gallery, Washington; William H. Seward, State Library, Albany; James Lenox (1851), in the Lenox Library, New York. In the Metropolitan Museum are the portraits of Archbishop Hughes, "A Lady," Comte de Paris, and "The Artist."

HEALTH (AS. *hælþ*, from *hāl*, Goth. *hails*, OHG., Ger. *heil*, Eng. *whole;* connected with OChurch Slav. *cĕlŭ*, whole, OPruss. *kailūstikan*, health, OIr. *cēl*, augury, and probably with Skt. *śiva*, healthful, kind). The condition of a living body in which all the tissues are in a state of

soundness or integrity, and the organs perform their functions normally; in which waste and repair go on progressively, and in which proper growth or retrograde metabolism occurs, according to the age of the individual, disease being absent. Disease is present when the integrity of the blood or of other tissues is impaired, where function is disordered, or where excessive growth or abnormal retrogression and decay occur. Perfect health is rarely seen, and never continues for any considerable portion of life in the artificial conditions of modern existence among civilized people. Health is therefore a comparative term.

Health officers are elected or appointed in all towns of any size in the United States, whose duty it is to limit the spread and prevent the invasion of disease, to enforce sanitary laws, and take all precautions to safeguard the health of citizens.

The reports of occurrence of disease and death are recorded by county, State, and national health officials. For the distribution of diseases, see DISTRIBUTION OF DISEASES. For the consideration of measures to safeguard the public health, see SANITARY SCIENCE; and for a consideration of the laws of health, see HYGIENE.

HEALTH, BILL OF. In shipping, a certificate of a consul, etc., as to the health of the crew, when the ship has come from a suspected port. A clean bill, a suspected bill, and a foul bill, are the three short names given to the several degrees of health.

HEALTH, BOARDS OF. Institutions organized under Government and deriving powers from the laws for the purpose of protecting the health of the citizens.

MUNICIPAL BOARDS OF HEALTH. These are created for the purpose of controlling and repressing agencies which undermine the health of the residents of a city or a municipality. The function of such a board is to adopt ordinances which compose a sanitary code, under which certain measures may be enforced, and the authority of the officers of the board may be maintained. Such a code includes provisions for the prevention of fraud and pretense in the preparation and sale of medicines, or of the sale of poisons except for lawful uses and purposes; of adulteration of coffees, teas, and other preparations from which beverages are made; for the control of the construction of buildings, ventilation, drainage, and plumbing; for the control of the sale of food and drink, to prevent stale, unwholesome, or unhealthy food, as well as adulterated or watered milk, from being offered in the market; to control the passage of cattle, horses, or any dangerous or offensive animals through the public streets; to regulate slaughtering and slaughter-houses; to exercise care over sidewalks in streets; to regulate the sanitary condition of pounds; to kill animals afflicted with hydrophobia; to prevent or limit offensive odors and liquids from any source; to provide for proper accumulation and removal of filth and dirt; to prevent diseased animals from being brought into the city, or dead, sick, or injured animals being left in the streets; to provide for the notification of contagious and infectious diseases; to control the unloading of vessels, the removal of sick persons, vaccination, exposure to disease, handling and interment of dead bodies; to outline the duties of coroners; to secure the reporting of vital statistics; to regulate matters relating to vehicles used for passenger transportation; and to control noise, expectoration in public conveyances, life-lines at bathing-places, etc.

As an example of a municipal board of health, the organization of the Health Department in New York City may be described, as it has existed since the adoption of the charter creating the Greater New York. In chapter xix. of this charter the several powers and duties of the health officers are set forth in detail. The head of the department is called the president of the Board of Health. The board consists of a single Commissioner of Health, Commissioner of Police, and the Health Officer of the Port. The Commissioner of Health is appointed by the Mayor (as is also the Commissioner of Police), and is the president of the board, and the executive officer. He may or may not be a physician. The first appointee in 1902 was a chemist and sanitary expert, Dr. Ernest J. Lederle.

Two bureaus have been established under the act of Legislature. The chief executive officer of one is called the Sanitary Superintendent, who at the time of his appointment must have been for at least ten years a practicing physician, and for three years a resident of the city. The chief officer of the second bureau is the Registrar of Records. An office of the Board of Health is established in each of the different boroughs of the city, wherein the business of the department is transacted. An assistant sanitary superintendent and an assistant registrar of records are appointed for each borough. Similar municipal boards of health exist in other cities.

STATE BOARDS OF HEALTH. These are institutions established by State legislative enactments, having many specific relations to the public health, and intended to have a central advisory relation to the local sanitary organizations, and also to supervise a State system of vital statistics. In 1900 there were 43 State boards in existence in the States and Territories of this country. The first organization under this name in the United States was established in Louisiana in 1855, but under the present acceptation of the term it is not to be classed with the average State Board of Health, as it was created for the sole purpose of maintaining a quarantine for the protection of New Orleans. Following are the dates in which boards of health were established in the different States and Territories: Massachusetts, 1869, under a law for which successive Legislatures had been asked since 1856; California, 1870; Virginia and Minnesota, 1872; Michigan, 1873; Maryland, 1874; Alabama and Georgia, 1875; Colorado and Wisconsin, 1876; Mississippi, New Jersey, Tennessee, and Illinois, 1877; Connecticut, Kentucky, Rhode Island, and South Carolina, 1878; Delaware and North Carolina, 1879; Iowa and New York, 1880; Arkansas, Indiana, West Virginia, and New Hampshire, 1881; Missouri, 1883; Maine, Kansas, and Pennsylvania, 1885; Ohio and Vermont, 1886; Florida and North Dakota, 1889; Nebraska, Washington, Oklahoma, and South Dakota, 1891; Nevada, 1893; New Mexico, 1895; and Utah, 1898.

As an example of the organization of a State Board of Health that of New York may be mentioned, which is composed of a single commissioner, assisted by a secretary, a chief clerk, a

medical expert, a pathologist and bacteriologist, a director of the Bureau of Chemistry, a director of the Cancer Laboratory, a director of the Antitoxin Laboratory, a registrar of vital statistics, a consulting ophthalmologist, and a consulting engineer.

NATIONAL BOARD OF HEALTH. A National Board of Health was organized in 1879. At the end of four years this board went out of existence, having investigated diseases of food-producing animals, adulteration of food and drugs, disposal of sewage, having established quarantine, and secured consular reports regarding disease and sanitation. At present these labors are performed by the Bureau of Animal Industry, various food commissioners, and the United States Marine Hospital Service, which is connected with the Department of the Interior. Some Congressmen favor a proposition to create a National Board of Health, at whose head shall be a Secretary of Health, who shall be a member of the Cabinet.

HEALTH ASSOCIATION, AMERICAN PUBLIC. On April 18, 1872, an informal conference was held in the city of New York of representatives of five States and five cities, at which a committee was appointed to draw up a constitution for the organization of a national institution for the promotion of sanitary science. The committee made its report at a subsequent meeting, held September 12th and 13th, at which there were representatives from New York, Pennsylvania, Ohio, Illinois, Louisiana, Connecticut, Rhode Island, and the District of Columbia. A constitution was adopted and officers elected. This constitution was slightly amended at the next annual meeting, held in New York, November, 1873, and contained among its provisions the following: "The officers shall be a president, a first and second vice-president, a secretary, and a treasurer. All the officers shall be elected by ballot annually, except the secretary, who shall be elected for a term of three years." A standing executive committee consists of "the president, first vice-president, secretary and treasurer, and six members annually elected by ballot." The objects of the association are to a great extent served by annual meetings, when matters of importance relating in various ways to sanitary science are discussed, the essays and addresses being published in an octavo volume of from four to five hundred pages. Meetings of this body have been held regularly up to the time of the publication of this volume. Regular proceedings have been published, which may be consulted for the details concerning the papers read and discussed. The association has exerted considerable influence in the improvement of the sanitary condition of the country.

HEALTHS, DRINKING. See DRINKING USAGES: TOASTS.

HEA'LY, TIMOTHY MICHAEL (1855—). An Irish Nationalist and member of the British Parliament. He was born at Bantry, Ireland, and until thirteen years of age was educated at the Christian Brothers' School, Fermoy; after which he became a clerk in a business house, and then a stenographer on the North Eastern Railway, at Newcastle-on-Tyne. Previous to 1878 he had been a frequent contributor to the press, but in that year went to London to write a weekly letter for the Dublin *Nation*. In 1880, associated with Mr. Parnell and Mr. Dillon, he made a lecture tour of the United States. On his return to England he was arrested for utterances made in a speech at Bantry; was elected unopposed from Wexford Borough; went to his trial in December, and was acquitted. The 'Healy Clause' in the Land Act in 1881, enacting that no landlord should levy rent on improvements made by the tenant, was due to him. He attended the Land League Convention in Chicago in 1881, when $250,000 were voted to aid the Irish cause. After speaking in all the principal cities in America he returned to England, was cited to appear before the Queen's Bench, and, refusing to give bail, was sentenced to six months' imprisonment, but released at the end of four months. He has represented Wexford, Monaghan, South Derry, and North Louth in Parliament. In 1891 he opposed Mr. Parnell; and in 1895 was expelled from the Parliamentary Committee. He was made King's Counsel in 1899, having been admitted to the Irish bar in 1884. In 1900 he was instrumental in ending the Parnellite difficulties by the nomination of Mr. Redmond as chairman of the reunited Irish Party. He wrote *A Word for Ireland* (1886), and text-books on the Land Acts.

HEANOR, hē'nēr. A town in Derbyshire, England, 8 miles northeast of Derby (Map: England, E 4). It has important coal-mining and iron-manufacturing industries. Population, in 1891, 13,600; in 1901, 16,250.

HEAP, CHARLES SWINNERTON (1847—). An English musician, born at Birmingham. He won the Mendelssohn scholarship, and studied at the Leipzig Conservatory under Moscheles, Hauptmann, and Richter, and became on his return to England, in 1867, a pupil of the distinguished organist W. T. Best. He was conductor of the Birmingham Philharmonic Society (1870-86), the Stafford Society, the Wolverhampton Musical Festival, the North Staffordshire Festival (1888—), and in 1897 became chorus-master of the Birmingham Festival. He received the degree of Doctor of Music from Cambridge in 1872. Among his compositions are the cantatas, *The Maid of Astolat* (1886), and *Fair Rosamond* (1890); the oratorio, *The Captivity;* numerous sonatas, anthems, organ-pieces, and songs.

HEAP, DAVID PORTER (1843—). An American engineer, born in San Stefano, Turkey. He was educated at Georgetown College, District of Columbia, and at West Point, where he graduated in 1864. During the remainder of the Civil War he served with the engineer corps of the Army of the Potomac, and was brevetted captain on April 2, 1865. Two years afterwards he received his commission as captain; in 1883 he was made a major, and in 1895 a lieutenant-colonel of engineers. After the war he was chiefly employed in building fortifications and improving harbors. He explored the Yellowstone National Park in 1871, and ten years afterwards was the military representative of the United States at the Paris Congress of Electricians. His publications include: *History of the Application of the Electric Light to Lighting the Coasts of France* (1883); *Electrical Appliances of the Present Day* (1884); *Ancient and Modern Lighthouses* (1887).

HEARING (from *hear*, AS. *hȳren*, *hēran*, Goth. *hausjan*, OHG. *hōrren*, Ger. *hören*, to hear,

connected with Gk. ἀκούειν, *akouein*, to hear, and possibly ultimately with Eng. *ear*). In its broadest sense, any judicial examination of the issues in a legal proceeding, whether those issues are presented in a formal action at law, in a suit in equity, or upon a motion, or upon the appearance of one party only. Specifically, however, the term 'hearing' signifies the proceeding in an equity suit, which corresponds to a 'trial' in an action at law. See TRIAL; PROCEDURE.

HEARING. See AUDITION; EAR.

HEARN, hērn, LAFCADIO (1850-1904). An American author, born in the Ionian Islands, the son of an Englishman and a Greek woman. He was educated in England and France, came to the United States, and engaged in journalism, first in Cincinnati, then in New Orleans, and New York. After winning quite a reputation for his powers of picturesque description, he went to teach in the University of Tokyo, and became a citizen of Japan. Among his writings are: *Chita: A Memory of Last Island* (1889); *Two Years in French West Indies* (1890); *Youma, the Story of a West Indian Slave* (1890); and, after his going to Japan, *Out of the East* (1894); *Glimpses of Unfamiliar Japan* (1895); *Reveries and Studies in New Japan*, *Kokoro* (1896); *Hints and Echoes of Japanese Inner Life*, *Exotics and Retrospectives*, *Gleanings in Buddha Fields* (1897); *Shadowings* (1900); and *Kotto* (1902).

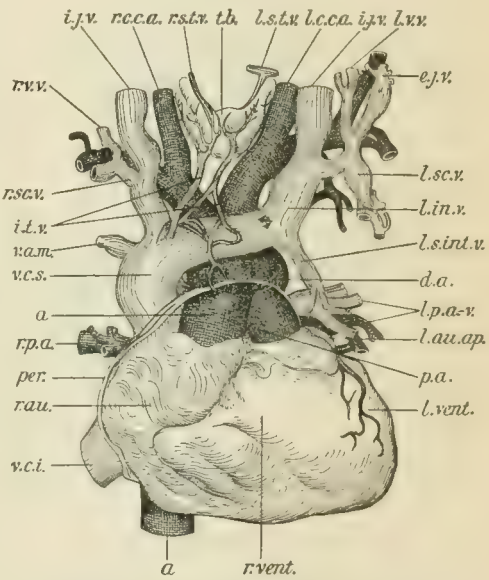
HEARNE, THOMAS (1678-1735). An English antiquary, born at White Waltham, Berkshire, and educated at Oxford, where he passed his life at Saint Edmund Hall. He was appointed second keeper of the Bodleian Library in 1712, but lost his post and all hope of university preferment owing to his refusal to swear allegiance to the House of Hanover. He superintended the publication of a large number of chronicle histories and similar works; as Leland's *Itinerary* (1710-12); Alred's *Annales* (1716); Camden's *Annales* (1717); and Robert of Gloucester's *Chronicle* (1724). From 1705 to within a few days of his death, he kept an extensive diary, the manuscript of which fills 145 volumes. The most valuable parts of it are being published for the Oxford Historical Society under the editorship of C. E. Doble. Pope gave Hearne an undeserved place in the *Dunciad* (iii., 185-90).

HEARSAY EVIDENCE. See EVIDENCE.

HEARSAY RULE. In the law of evidence, the rule that excludes hearsay testimony upon the trial of an action; i.e. second-hand evidence, or that in which the materiality depends upon facts stated to the witness by another and not those observed by himself. Thus, if A as a witness testifies that B told him that C was present at the scene of an accident, this evidence is inadmissible, if the material fact is the presence of C at the accident; but if the material fact were that B made the statement to A, the evidence would be material. See further under EVIDENCE.

HEARSE, or **HERSE** (OF. *herce*, Fr. *herse*, It. *erpice*, ML. *hercia*, *hersia*, harrow, from Lat. *hirpex*, harrow). A name now used to designate the conveyance in which a coffin is borne to the grave. It had originally quite a different meaning. The term was formerly applied to a metal grating or spike fence with upright spikes for the reception of candles for illumination and the hanging of decorative draperies around a tomb, or at a gateway. Afterwards it was used at the ceremonies of the Church and at funeral services. It was very simple in form, but in the fifteenth and sixteenth centuries hearses of great splendor came into use, and were erected in the churches over the bodies of distinguished personages. They were often of metal, and the permanent adjunct to tombs. At other tombs they were around the altar. The framework was of wood, iron, or brass, sometimes of beautiful workmanship, square, octagonal, etc., in plan, with pillars at the angles and arched framework above forming a canopy. The whole was hung over with rich cloths and embroidery, banners, and coats of arms, and lighted up with hundreds of wax candles and decorated with wax images. Such hearses were used at public funerals and set up in the streets. They were temporary. From this the transition to the modern funeral hearse can be easily traced. In Roman Catholic churches of the present day the hearse still exists as a triangle with spikes, on which candles are placed.

HEART (AS. *heorte*, Goth. *hairtō*, OHG. *herza*, Ger. *Herz*; connected with Lat. *cor*, Gk. καρδία, *kardia*, Lith. *szirdìs*, OChurch Slav. *sridĭce*, Arm. *sirt*, heart; probably connected with Skt. *hṛdaya*, Ar. *zərəδaya*, heart, or with Skt. *śraddhā*, Lat. *credere*, to trust). A muscular



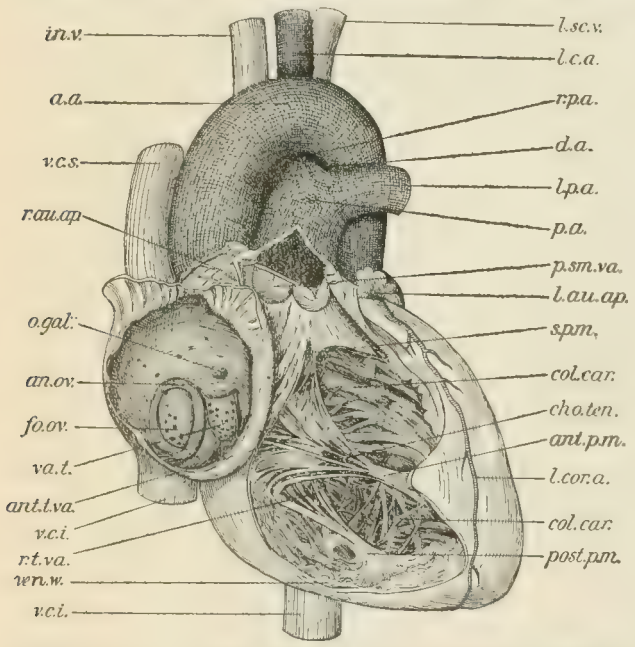
ANTERIOR VIEW OF THE HEART WITH THE LARGER BLOOD-VESSELS.

i.j.v., internal jugular vein; *r.c.c.a.*, right common carotid artery; *r.s.t.v.*, right superior thyroid vein; *r.v.v.*, right vertebral vein; *i.j.v.*, internal jugular veins; *r.s.c.v.*, right subclavian vein; *i.t.v.*, inferior thyroid vein; *v.a.m.*, vena azygos major; *v.c.s.*, vena cava superior; *a.*, aorta; *r.p.a.*, right pulmonary artery; *per.*, cut edge of pericardium; *r.au.*, right auricle; *v.c.i.*, vena cava inferior; *r.vent.*, right ventricle; *t.b.*, thyroid body; *l.s.t.v.*, left superior thyroid vein; *l.c.c.a.*, left common carotid artery; *l.v.v.*, left vertebral vein; *e.j.v.*, external jugular vein; *l.sc.v.*, left subclavian vein; *l.in.v.*, left innominate vein; *l.s.int.v.*, left superior intercostal vein; *d.a.*, ductus arteriosus; *l.p.a.-v.*, left pulmonary artery and vein; *l.au.ap.*, left auricular appendix; *p.a.*, left pulmonary artery; *l.vent.*, left ventricle.

organ situated in the thorax, occupying part of the space between the lungs, and acting as a pump for propelling the blood to all parts of the

body. It is a four-chambered organ, consisting of two upper parts, the right and left auricles, and two lower parts, the right and left ventricles. This article will be confined to a description of the human heart. It is cone-shaped and flattened, and in the adult lies obliquely behind the lower two-thirds of the sternum, projecting considerably to the left. Its base is upward, and directed somewhat backward, and is situated practically at the level of the third intercostal space. Its apex is directed to the left, downward and forward, and reaches the space between the fifth and sixth costal cartilages. The heart is so tilted that the margin of its right ventricle lies upon the central tendon of the diaphragm. The adult heart is about five inches from base to apex, by three and one-half inches across the base, by two and one-half inches thick. Its weight is, in the male eleven ounces, and in the female about nine ounces.

The right auricle receives the venous blood from the venæ cavæ and empties it into the right ventricle. The auricle presents a central cavity or sinus of nearly quadrangular shape and a small appendix somewhat resembling a dog's ear, and called the auricular appendix. The walls of the auricle are composed of two layers of muscular fibre and are very thin. The left auricle resembles its fellow of the right side. It receives the blood from the lungs through the four pulmonary veins, which empty, without valves, by four distinct openings. It opens into the corresponding ventricle by means of the left auriculo-ventricular orifice. Each auricle holds within its cavity, moderately distended, about two ounces of fluid. The ventricles, which constitute the bulk of the heart, are characterized by the great thickness of their walls and their large capacity relatively to the auricles. The cavity of each ventricle is conoidal, that of the right being broader and shorter and a trifle more capacious than that of the left. Prominent muscular ridges and papillæ, the *columnæ carneæ*, arise from the inner surface of each ventricle, and from them the *chordæ tendineæ*, fibrous cords, pass to the free border of the valves which close the openings between auricles and ventricles. There are four valves in the heart. The mitral valve closes the left auriculo-ventricular opening, and consists of two segments. When these are closed together the blood is prevented from regurgitating from the left ventricle into the left auricle. The tricuspid valve, situated in the right ventricle, closes the right auriculo-ventricular opening. It consists of three segments, each triangular in shape and adherent to each other at the portion of their free margins which is nearest the fibrous ring from which they arise. The largest of the segments is nearest the pulmonary artery. The semilunar valves are found at the aortic and pulmonary orifices of the heart. The aorta (q.v.) springs from the left ventricle, and through it passes the blood to the arterial system. The pulmonary artery springs from the right ventricle, and through it blood passes to the lungs. The closure of the flaps of the semilunar valves prevents regurgitation of the blood into the aorta and pulmonary artery when the heart expands during the diastole. These valves are well supplied with fibrous material and possess great rigidity, so that they retain their shape. They open out of the ventricles and not in their cavities.



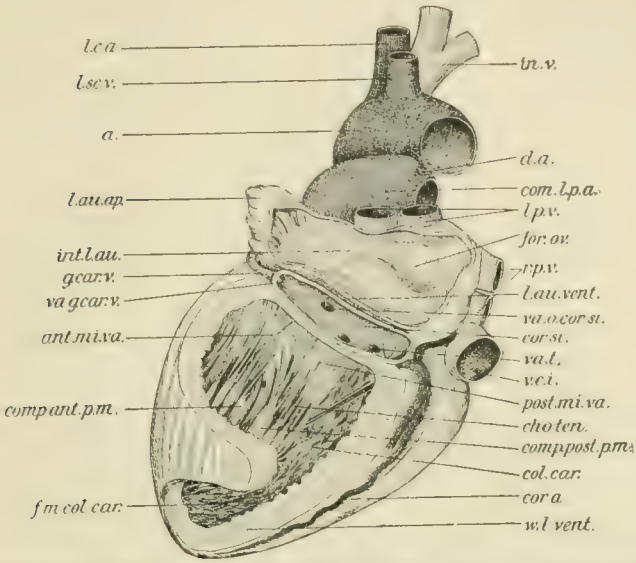
ANTERIOR VIEW OF THE RIGHT CHAMBERS OF THE HEART, WITH THE GREAT VESSELS.

in.v., innominate vein; *a.a.*, arch of aorta; *v.c.s.*, vena cava superior; *r.au.ap.*, right auricular appendix; *o.gal.*, orifice of vein of Galen; *an. ov.*, annulus ovalis; *fo.ov.*, fossa ovalis; *va.t.*, valve of Thebesius; *ant.t.va.*, anterior segment of tricuspid valve; *v.c.i.*, vena cava inferior; *r.t.va.*, right segment of tricuspid valve; *ven.w.*, section of ventricular wall; *l.sc.v.*, left subclavian vein; *l.c.a.*, left carotid artery; *r.p a.*, right pulmonary artery; *d.a.*, ductus arteriosus; *l.p.a.*, left pulmonary artery; *p.a.*, pulmonary artery; *p.sm.va.*, pulmonary semilunar valves; *l.au.ap.*, left auricular appendix; *s.p.m.*, small papillary muscle connected with septum; *col.car.*, columnæ carneæ; *cho ten.*, chordæ tendineæ; *ant.p.m.*, anterior papillary muscle; *l.cor.a.*, left coronary artery; *post p m.*, posterior papillary muscle.

The heart receives its nourishment from blood conveyed to it by the coronary arteries during the diastole of the heart. The veins of the heart accompany the arteries and return their blood into the cavity of the right auricle. The nerves of the heart run into the *deep* and *superficial cardiac plexuses*, and also the *posterior* and *anterior coronary plexuses*. These plexuses are formed by sympathetic nerve-fibres and by filaments from certain cranial nerves. The heart and the roots of the great vessels are enveloped in the pericardium (q.v.), a sac of conical shape with base below lined with serous membrane (which is reflected over the heart) and containing a very small amount of fluid.

The contraction of the heart, which occurs from 70 to 80 times a minute, begins in the auricles, which empty their blood into the ventricles. The ventricles then contract, the left to empty itself through the aorta, the right to empty itself through the pulmonary artery. The mitral valve

in the left heart prevents regurgitation of blood into the right auricle, and the tricuspid valve in the right heart prevents a like accident in the case of the left auricle. The semilunar valves, as stated, prevent regurgitation at the end of the contraction, or systole. The diastole, or expansion, of the heart begins at once, and the auricles dilate, the right one receiving blood from the two venæ cavæ, which carry venous blood from the upper and lower parts of the body; the left one receiving arterial blood from the lungs



POSTERIOR VIEW OF THE LEFT CHAMBER OF THE HEART, WITH THE GREAT BLOOD-VESSELS AND CORONARY SINUS LAID BARE.

l.c.a., left carotid artery; *l.sc.v.*, left subclavian vein; *a.*, aorta; *l.au.ap.*, left auricular appendix; *int.l.au.*, interior of left auricle; *g.car.v.*, great cardiac vein; *va.g.car.v.*, valve of great cardiac vein; *ant.mi.va.*, anterior segment of mitral valve; *comp.ant.p.m.*, compound anterior papillary muscle; *f.m.col.car.*, fine mesh-work of columnæ carneæ at the apex of ventricle; *in.v.*, innominate vein; *d.a.*, ductus arteriosus; *com.l.p.a.*, commencement of left pulmonary artery; *l.p.v.*, left pulmonary veins; *for.ov.*, concave edge of the foramen ovale; *r.p.v.*, right pulmonary veins; *l.au.vent.*, left auriculo-ventricular opening; *va.o.cor.si.*, valve orifice of vein in coronary sinus; *cor.si.*, coronary sinus; *va.t.*, valve of Thebesius; *v.c.i.*, vena cava inferior; *post.mi.va.*, posterior segment of mitral valve; *cho.ten.*, chordæ tendineæ; *comp.post.p.m.*, compound posterior papillary muscle; *col.car.*, columnæ carneæ; *cor.a.*, coronary artery: *w.l.vent.*, section through wall of left ventricle.

through the four pulmonary veins. The ventricles then expand, and the blood passes through the auriculo-ventricular orifices from the auricles until they are full, and the diastole is then complete. (See CIRCULATION.) Previous to birth, the circulation in the infant differs, because of structural differences. See FŒTUS; EMBRYO.

SOUNDS OF THE HEART. On applying the ear to the cardiac region of a living man or mammal, in a state of health, two successive sounds are heard, each pair of which corresponds with one pulsation. These are known as the *first* and the *second* sound. The *first* sound is dull and prolonged, while the *second* is short and sharp, and the difference between them is well expressed by articulating syllables, lubb, dŭp. The first sound continues during three-tenths of the pulsation, then follows the 'short pause' lasting one-tenth, next the second sound lasting two-tenths, lastly the 'long pause' lasting four-tenths.

The cause of the first of these sounds has been a subject of much discussion. During the first sound several distinct actions are taking place, to which it is ascribed by physiologists. Thus we have (1) the impulse of the apex of the heart against the side of the chest; (2) the contraction of the muscular walls of the ventricles; (3) the tension of the auriculo-ventricular (tricuspid and mitral) valves and of the chordæ tendineæ. (See CIRCULATION.) The second sound is caused by the sudden closure of the valves of the aorta and of the pulmonary artery as the currents of blood reverse at the instant the heart relaxes and begins to dilate.

When the valves are changed by disease, the sounds undergo special alterations, which are of the highest importance in diagnosis. The normal sounds may be intensified or weakened, or they may disappear entirely and be replaced by murmurs; or abnormal sounds may be heard simultaneously with, or in the intervals between, the normal ones. Thus we find murmurs of regurgitation in valvular insufficiency; murmurs of obstructed flow of blood in valvular stenosis; aneurismal murmurs; friction sounds in pericarditis, etc.

HEART, DISEASES OF THE. Heart disease is a term including many affections of the organ as well as disturbances in its action due to disease elsewhere. Galen (q.v.) was the first to write of disease of the heart, which Hippocrates (q.v.) had denied, though to Vesalius (q.v.) is due the credit of accurate and intelligent grasp of the subject. The discovery of the circulation of the blood by Harvey (q.v.) in 1628 led the way for the investigations which, nearly a century later, gave clinicians absolute knowledge of certain affections of the heart. Vieussens, Lancisi, Morgagni, Sénac, and Auenbrugger deserve mention in the history of this subject. Laénnec (q.v.), who, in 1819, added the method of auscultation to that of percussion, advanced by his teacher Corvisart, and who invented the stethoscope, opened the field to all explorers. Richard Bright (q.v.) detected the enlargement of the organ which accompanies Bright's disease of the kidneys. Kreysig and Bouilland recognized endocarditis. Virchow (q.v.), in 1856, elucidated thrombosis and embolism.

Diseases of the heart are either (1) functional, or (2) organic. In *functional* diseases there is no discoverable alteration in structure, and the disorder of function is due to nervous influences. In *organic* diseases structural alteration is present.

FUNCTIONAL HEART DISEASES.

These include disorders in the beating of the heart and in the nature of its contractions, as well as neuralgic pains in the heart. Palpitation is the term given to a rapid and more or less distressing beating of the heart, in which the pulse may be accelerated from the normal 75 to 80 beats a minute to 150 or more a minute. This condition may be due to organic

disease, or it may be due to emotional disturbance (as fright or embarrassment), or to excessive physical strain, or to indigestion, with a production of gas and toxins, or to nervous disorder such as neurasthenia, or to tobacco, tea, coffee, alcohol, or certain drugs, or to hemorrhage, or to certain diseases, such as Basedow's disease (q.v.). Generally nervous excitability, apprehension, shortness of breath, increased perspiration, and flushing of the face accompany palpitation. Acute pain in the heart is experienced by some patients during attacks of hysteria, for example; neuralgia of that organ also occurs. Cardiac pain also accompanies fermentative dyspepsia. Disease of the coronary arteries causes, it is believed, the exquisitely painful angina pectoris (q.v.).

ORGANIC DISEASES.

Besides angina pectoris, these include pericarditis, endocarditis, myocarditis, hypertrophy, dilatation, embolism, aneurism, and degenerative changes without inflammation. More than one disease may be found co-existing, and both functional and organic diseases may be present together.

PERICARDITIS is an inflammatory disease in which the pericardium is thickened and roughened. The pericardium is a loose sac in which the heart lies, and its lining membrane is reflected over the external surface of the heart. The disease often coexists with gout or articular rheumatism, and is due to the same cause; or it accompanies Bright's disease. It may also be caused by injuries, exposure to cold and dampness, infectious diseases, etc. The normal serous fluid which should exist in the pericardium disappears and a sero-fibrinous fluid exudes from the blood-vessels, sometimes greatly distending the pericardial sac, generally causing adhesions between the two layers of the pericardium. If the amount of pericardial distention be great, the patient suffers with rapid pulse, oppressed breathing, and faintness. Occasionally the fluid must be drawn off by tapping. The attacks are always serious; and, if recurring, are generally fatal. There is pain felt, from the rubbing of the roughened surfaces as the organ beats, accompanied by what is called a friction sound. The area of heart dullness, as shown by percussion, increases with the production of fluid. In favorable cases the fluid is absorbed, and the sac regains, in great part, its normal condition. In very bad cases the inflammatory exudate consists of pus; such cases usually terminate fatally; evacuation of the pus affords the only hope of recovery.

DEGENERATIVE CHANGES IN THE HEART MUSCLE. Parenchymatous degeneration, or cloudy swelling, as it is often called, is the form of degeneration which usually accompanies the infectious diseases such as diphtheria or typhoid fever. The heart walls are somewhat softer than normally, and rather paler in color. The changes in the heart muscle cells are quite similar to the changes of parenchymatous degeneration in the cells of other organs. (See DEGENERATION.) The heart cells become gradually more granular, and in proportion to the extent of the granulation lose part or all of their normal striated appearance. 'Hyalin,' 'amyloid,' and 'calcareous' degeneration may occur in heart muscle. *Fatty degeneration* of the heart muscle is a quite common lesion. Its causes are: anæmia, old age, wasting diseases, prolonged infectious fevers, certain poisons, such as phosphorus, etc. It consists in the replacement of the heart muscle cell protoplasm by, or its transformation into, fat, to a greater or lesser extent. The degeneration is often not distributed uniformly throughout the heart muscle, but occurs in patches. The degenerated muscle looks pale in color and is softer than normally. The fat droplets within the cells may be large or small, may be few in number, or in such numbers as to entirely destroy the normal appearance of the tissue. What is known as 'fatty infiltration of the heart' is not a lesion of the heart muscle itself, but consists in an accumulation of fat beneath the pericardium and in the connective tissue between the muscle-fibres. The amount of fat may be very large, causing atrophy of the muscle-tissue and interfering with the functions of the organ.

MYOCARDITIS. This is an inflammation occurring in the middle or muscular layer of the heart walls and involving also the blood-vessels and interstitial connective tissue. The acute form is frequently suppurative in character, and occurs as an extension from an ulcerative endocarditis or pericarditis, or as a complication of one of the infectious diseases. It may be diffuse, or, as is more commonly the case, circumscribed with the formation of abscesses. In the chronic form of myocarditis the lesion consists in an increase in the connective tissue elements of the heart, with more or less atrophy of the muscular elements. The condition is usually associated with lesions of the coronary arteries. Opinions differ as to the primary lesion, some holding that the atrophy of the heart muscle is dependent upon the increase in connective tissue, a true productive inflammation; others that the degeneration of the heart muscle occurs first, the connective tissue proliferation being of the nature of a replacement hyperplasia. Syphilitic myocarditis and tubercular myocarditis sometimes occur. Myocarditis may give rise to few or no symptoms.

ENDOCARDITIS. The lesion in endocarditis is an inflammation of the endocardium, or lining membrane of the heart. While any portion of this membrane may be involved, it is common for the inflammation to be confined to that part of it which covers the valves of the heart and to result in an impairment of their efficiency. For this reason it is often referred to as 'valvular heart disease' or 'valvular endocarditis.' *Simple acute endocarditis* is a frequent complication of rheumatism. It may also be caused by some of the acute infectious diseases, especially scarlet fever and pneumonia. There may be simply thickening of the valves of the heart, their surfaces remaining smooth; or the valves may be rough and either eroded or studded with new growths, called vegetations, which give them a warty appearance. Microscopically the vegetations are seen to be made up of granulation tissue, covered on the surface with a layer of fibrin. There is usually more or less proliferation of the cells in the subendothelial connective tissue. *Malignant* or *ulcerative endocarditis* is due to the action of bacteria. The streptococcus and staphylococcus pyogenes are the most common incitants. More rarely the pneumococcus, the gonococcus, or the bacilli of anthrax, tuberculosis, or typhoid fever are present. The condition may be either primary or, as is more frequently the case, it may

exist as a complication of one of the infectious diseases. The valves of the heart may be covered with vegetations, or there may be suppuration or necrosis with destruction of tissue. The vegetations consist of granulation tissue covered with fibrin and containing many micro-organisms. It is most common on the mitral and aortic valves. More rarely, instead of occurring on the valves, it involves the walls of the heart, when it may lead to perforation either of a septum or of the external wall itself. Detachment of bits of the vegetations or necrotic tissue is not uncommon. Entering the circulation, they form infectious emboli, setting up foci of infection in distant parts of the body. *Chronic endocarditis*, the usual forerunner of valvular diseases of the heart, consists in sclerosis of one or more of the valves of the heart. The sclerosis may be primary, but is usually secondary, to the acute form of the disease. In this again, the cause is primarily in most cases rheumatism; gout, syphilis, alcoholism, and Bright's disease are also important etiological factors. A common cause, especially in the case of the aortic valve, is constant and excessive muscular exertion. There may be small vegetations on the valves representing remains of acute inflammation. The valves are thickened, opaque, and shrunken. This shrinkage produces deformity; the edges become curled so that the valve is incapable of perfect closure. In this way the valve may become insufficient without any degree of stenosis (narrowing of the opening), or, as the process goes on and the thickening becomes greater, the stenosis may be marked. In the later stages of the disease lime salts are frequently deposited in the new connective tissue of the valves, forming a dense mass of calcareous tissue. Chronic endocarditis may affect the walls of the heart, forming patches of fibrous tissue. Tuberculous endocarditis sometimes occurs.

Endocarditis, whether due to rheumatic inflammation (and the heart complication is said to occur in over 40 per cent. of the cases of rheumatism), or whether due to other causes, produces difficulty with the action of the valves of the heart. The thickening of the cusps or flaps of the valves, due to deposits between the layers of endocardium which cover them, makes them clumsy and unyielding. They may obstruct the flow of blood through them, causing *stenosis*. The valve-flaps may become shortened from contraction of the fibrous structure newly developed, and allow the blood to flow back through the valves when they are shut as tightly as possible, causing *regurgitation*. Alteration of the normal heart sounds reveals to the trained ear information which will determine the condition. (See *Sounds of the Heart*, in the article HEART.) A rough surface on the valve-flaps may lead to a deposit of fibrin from the blood, and the formation of a thrombus (q.v.). A thrombus, or a vegetation (a fringe or small lump of granulation tissue), may become broken off and be carried up into an artery of the brain, plugging it, with dire results. Such a plug is called an *embolus*, and the occurrence is termed *embolism* (q.v.). The result of embolism of a cerebral artery may be immediate death, paralysis, convulsions, or secondary softening, with consequent mental deterioration in course of time. Chronic endocarditis may exist for a considerable length of time without causing any symptoms; the heart becoming hypertrophied in one or another of its parts, and being thus enabled to meet the extra amount of work that is thrown upon it by the valvular stenosis or insufficiency. Sooner or later, however, the disease causes the appearance of symptoms, of which the most characteristic are: Shortness of breath, hemorrhage from the lungs, blueness of the lips and finger-nails, dropsy of the hands and feet, dyspepsia, headaches, vertigo, and fainting spells. The prognosis depends upon the particular valve affected, the existence or non-existence of compensatory hypertrophy, the age of the patient, etc.

HYPERTROPHY OF THE HEART. This consists in thickening of the heart walls, the cavity of the heart remaining of normal size (*simple hypertrophy*), contracting (*concentric hypertrophy*), or dilating (*eccentric hypertrophy*). The muscle tissue in hypertrophy of the heart is enlarged, probably both by increase in the number of fibres and by increase in size of the individual fibres. The hypertrophied muscle is dense, firm, and dark in color. If the hypertrophy affects both ventricles, there is an increase in both length and breadth of the heart. If the left ventricle alone is affected, there is an increase in the length of the heart, while hypertrophy of the right ventricle broadens the heart on the right side. Hypertrophied hearts may weigh from two to three pounds or more. Dilatation of the heart may, as already mentioned, be associated with hypertrophy. This is known as active dilatation. Or dilatation may occur with thinning of the heart walls, which is known as passive dilatation. The dilatation may affect any one or all of the cavities. The right side of the heart is more frequently affected than the left side.

Dilatation with compensating hypertrophy, if the valves of the heart are competent, is of little moment. The heart is the stronger for the hypertrophy. Mountain-climbing may cause it, as well as mental emotion with oft-repeated increase of the heart's action, or obstacle to the circulation. When the heart has become enlarged as a sequel of kidney disease, it is the latter that causes death when it comes. The ventricles are far more often dilated than the auricles, though all four cavities may be dilated. Should the hypertrophied heart become fatty, a grave danger arises; progressive cardiac failure may occur, with weakening of the circulation and dropsy of the lower extremities.

In the main, heart diseases are rare, and they are an infrequent cause of death. One with valvular trouble of a mild degree may fulfill the ordinary expectation of life, if he is content to live on a level, avoiding violent exercise, running or lifting, and avoiding anger, grief, and general emotional conditions. Cases of sudden death, called death from heart disease, are often due to cerebral embolism.

ANEURISM OF THE HEART is very rare. It is always fatal. Consult: Strümpell, *Text-Book of Medicine* (New York, 1901); Osler, *Practice of Medicine* (New York, 1901).

HEART-BURIAL. See BURIAL.

HEART-LYMPH. See CIRCULATORY SYSTEM, EVOLUTION OF.

HEART OF ENGLAND. A name applied to Warwickshire, as the middle county of England.

HEART OF MIDLOTHIAN, mīd-lō'THĪ-an. One of Scott's *Tales of My Landlord*, purporting to have been written by a schoolmaster, Peter Pattison, and on his death to have been edited by his friend Jedediah Cleishbotham. It was published in 1818, and its title was taken from the popular name of the Tolbooth, an Edinburgh prison, which had been torn down the year before. It represents the best side of the Covenanting temper, and the scene opens in Edinburgh at the time of the Porteous Riots, September 7, 1736.

HEARTS. A game of cards, most frequently played by four persons. The whole pack is ordinarily dealt, in succession, one to each of the four, until each player has thirteen cards. The first player to the left of the dealer plays any card he likes, the rest following suit, if possible. The highest card of the suit played wins the trick. If the player cannot follow suit, he may play any card he pleases, and, when hearts are not led, he has the opportunity of getting rid of them. The winner of the first trick leads for the second; and so on until all the thirteen tricks have been taken. Then the players in turn expose their hands, count the number of the hearts, and pay into the pool one chip or unit for each one they have, and the pool is divided as provided for under the rules, or it remains, under some circumstances, as an added stake for the next hand. But if the settling is according to Hoyle's rule, each player also pays in addition as many other chips as there are other players (in every four-handed game there are, of course, three other players, and a player who has two hearts has to pay six chips, and so on all round). There will always, therefore, be thirty-nine chips in the pool. Then each player draws out of the pool one chip for every heart *not* taken by him in the play. Thus if one player has not taken any hearts he draws thirteen chips. The man who has taken three hearts takes ten chips, he who has taken four hearts takes nine chips, and he who has taken six hearts takes seven chips. This exhausts the pool. It is impossible to discuss in detail the reasons which will operate in a player's mind in the various heart games; even to the determination to endeavor to take all the hearts. 'Progressive hearts' is played after the manner of progressive euchre, so far as the arrangement of players, tables, and scoring is concerned. In the double, or *eagle game*, each player gives for an ace, 14; a king, 13; a queen, 12; a knave, 11; and for each of the other cards, the equivalent of the spots they stand for. This is instead of paying the pool one chip for each heart taken. It may also be played so that the ace counts 5; queen, 3; knave, 2; and all other cards 1. The variations of the game include 'six-handed hearts,' 'three-handed,' 'sweepstake,' 'auction,' 'spot,' 'drive,' 'joker,' and 'jack pot.'

HEART'S CONTENT. A port of Newfoundland on Trinity Bay (Map: Newfoundland, G 5). It is an excellent harbor and noted as the landing-place of three Atlantic telegraph cables from Valentia, Ireland. Population, in 1891, 1186; in 1901, 1079.

HEART'S-EASE. See VIOLET.

HEART-URCHIN. See ECHINOIDEA.

HEAT (AS. *hæu*, OHG. *heizi*, heat; connected with AS. *hit*, Icel. *hiti*, Goth. *heito*, OHG. *hizza*, Ger. *Hitze*, heat, and AS. *hāt*, Icel. *heitr*, OHG. *heiz*, Ger. *heiss*, Eng. *hot*). A definite sensation, known as 'warmth,' is felt when one places his hand near a flame, exposes it to the sun, rubs it with the other hand, etc. A different sensation is experienced when the hand is placed on a block of ice, or is when wet exposed to a draught of air, etc. These sensations are due to two sets of nerves, which correspond to the 'temperature' sensations. If natural objects are exposed to conditions similar to those just described it is observed that they undergo certain changes; in fact, as a rule, all of their physical properties excepting inertia and weight are affected; their size, shape, state, electrical and magnetic properties, elasticity, etc. These changes, when produced in this manner, are called 'heat-effects.'

From the time of the Greek philosophers, Epicurus and Democritus, until about 1800, heat-effects were believed to be due to the addition of a substance to the body experiencing the effects; or, in other words, heat was considered a form of matter. Such an idea was furthered when Professor Stahl (1660-1734), of the University of Halle, announced the theory of 'phlogiston,' which was represented as a material substance emitted from a burning body. That the theory of the material nature of heat, which in this form was called caloric, was generally accepted in the eighteenth century, is shown by the fact that prizes of the French Academy of Science, offered in 1738, for essays on the Nature of Heat, were granted to scientists who took this view of the question. Although the material idea of heat prevailed during the seventeenth and eighteenth centuries, it must be mentioned that, by some physicists of those and earlier times, it was considered as a mode of motion in some form or other, just as a few philosophers at different times believed in the undulatory theory of light, and in a crude way formulated their ideas. Such men as Descartes, Amontons, Boyle, Francis Bacon, Hooke, and Newton believed that heat must be due to motion of the substance, but could not substantiate their theories by experimental proof, or urge them with such force as to secure their adoption. At a time when experimental knowledge was exceedingly limited, that these men should have arrived at such results by pure reasoning, is a matter of great wonder, and if they had continued and verified their theories by actual experiments it is safe to assume that the dynamical theory would have been established on a definite basis far earlier.

Caloric, according to the eighteenth-century physicists, was a fluid of an elastic and self-repellent nature, which permeated all matter. The various heat-effects were very plausibly explained on this basis, and it was a long time before the theory was overthrown. The first serious opposition came from Count Rumford (1753-1814), whose experiments on the production of heat by friction were published in 1798. These led him to believe that heat, instead of being a material substance, was merely motion. In fact, in 1804 he wrote to Pictet: "I am satisfied that I shall live a sufficiently long time to have the satisfaction of seeing caloric interred with phlogiston in the same tomb." Experiments by Humphry Davy (1778-1829), in which two pieces of ice were melted by friction, caused him also to think that heat was merely the vibration of the corpuscles of the body. In 1812 he asserted that the

immediate cause of the phenomenon of heat is motion, and "the laws of its communication are precisely the same as the laws of the communication of motion." Rumford and Davy were also assisted by Thomas Young (1773-1829) in their attempts to displace the theory of caloric, but, in spite of their efforts, the old theory continued to be accepted for many years, and, in fact, Sadi Carnot (1796-1832) in his famous treatise, *Reflexions sur la puissance motrice de feu*, reasoned on this basis, although later he became finally convinced of the truth of the dynamical theory. It is to the experiments of Joule, however, that we owe the most complete evidence in favor of the idea that heat-effects are due to energy. (It should be borne in mind that no experiments can *prove* this relation between cause and effect; they can simply be shown to be in accord with the theory.) The modern theory that heat-effects are due to energy alone is founded largely on the work of Carnot and Mayer. (See THERMODYNAMICS.)

The researches on heat are more or less closely connected with the development of the thermometer first made and used by Galileo (1564-1642), as described under THERMOMETER. There was also the stimulus of the invention of the steam-engine, and from the time of the construction of the first practical steam-engine (1711) many of the inventors who improved that machine carried on investigations in heat. Joseph Black (1728-99), who was among the foremost of these, was an assistant of James Watt, the great Scotch inventor, and later a professor of chemistry at Edinburgh. He derived the idea of latent and specific heats, and was the first to use proper methods for calorimetry (q.v.); Lavoisier (1743-94) and Laplace (1749-1827), working along lines somewhat similar, determined specific heats of a number of substances and devised calorimeters.

NATURE OF HEAT-EFFECTS. One of the simplest modes of producing heat-effects is by means of friction. If two pieces of ice are rubbed together they will melt; if two pieces of metal are rubbed violently their temperature rises—as detected by the 'temperature-sense'—they also increase in volume; if a paddle is turned rapidly enough in a vessel of water the water will boil. It requires work to produce friction; and the energy thus lost by the agency doing the work is gained by the bodies on which the work is done and which manifest the heat-effects. Similarly, in every known case, if such heat-effects as rise in temperature, expansion, boiling, melting, etc., are produced by any external agency, the latter can be proved to have lost energy; and the 'amount of the heat-effect' is proportional to the energy received. If, on the other hand, a body experiences the reverse changes, such as fall in temperature, contraction, condensation, freezing, etc., it may be proved that it loses energy. This energy which the body gains or loses is not kinetic energy of the whole body or of its visible parts, nor potential energy of strains of the entire body; it is energy associated with the minute portions of the body—its molecules and atoms. The energy of the body considered by itself—omitting any kinetic and potential energy of the whole body that it may have—is called its 'intrinsic' energy. This energy of the molecules and atoms is partly the kinetic energy of their irregular motions and vibrations, and partly potential energy in case it requires work to change their relative positions. In ordinary language a flame is called a 'source of heat;' when a body is brought near it is said to receive 'heat;' and the effects produced are said to be due to heat. These expressions are most unscientific and misleading. A flame is a source of energy; when a body is brought near, energy passes from the flame to it; part of this energy is spent in increasing the intrinsic energy of the body, and part in enabling the body to do external work, e.g. if it expands it pushes back the atmosphere or whatever rests against it, thus doing work. It is proper to speak of the energy which the body receives as 'heat-energy;' and in accordance with the conservation of energy one may say that 'heat-energy received' = 'increase in intrinsic energy' + 'external work done.' One can speak of the intrinsic energy in a body (although no idea can be formed of its amount or even nature); but it is as improper to speak of the amount of 'heat' in a body as it is to refer to the amount of sound in a horn or the amount of light in a candle.

ENERGY OF A GAS. One of the most important facts in regard to a gas is that, if it is allowed to expand under such conditions that it does no external work, there is no sensible change of temperature, showing that it has required no work to separate the molecules, and that the molecules themselves have not lost energy. In other words, there are no sensible forces either of attraction or of repulsion between the molecules of a gas, and so the energy of the molecules is entirely kinetic. This fact was first shown by Gay-Lussac and later by Joule; and, although the more elaborate experiments of Thomson and Joule showed that there were minute changes in temperature when a gas expanded freely, they indicate that the molecular forces are extremely small. If a gas is allowed to expand in such a manner as to do external work, the energy required for the work is taken from the kinetic energy of the molecules; a fall in temperature is always observed under these conditions when external work is done; and therefore the temperature of a gas depends upon the kinetic energy of its molecules.

TEMPERATURE. The units to be used in the measurement of the quantities involved in heat-effects are in most cases self-evident: the 'heat-energy' itself should be expressed in ergs or joules (q.v.); changes in volume, in cubic centimeters; melting or boiling, in number of grams experiencing the change, etc. The difficulty comes in giving a numerical value to 'temperature.' Primarily this is a question of sensation; and, although our senses give us a rough idea as to hot and cold bodies, they do not enable us to give numbers to the property of these bodies which corresponds to these sensations. Recourse must be had to the changes which some natural object undergoes under the conditions when the senses recognize differences in temperature, changes which may be measured. One of the simplest of these changes is alteration in volume. Two standard thermal states must be chosen arbitrarily, e.g. the thermal state of a mixture of pure water and ice at normal barometric pressure, and that of the vapor rising from pure water boiling under normal barometric pressure, because experiments have shown that these conditions are perfectly definite and unvarying. Let v_1 and v_2 be the volumes of any definite body, e.g. a piece of

iron or nitrogen gas initially at a certain density: under two thermal conditions, assuming no other changes in external conditions and particularly no change in the pressure on the body. Let v be the volume of the selected body under the thermal condition for which a numerical value is desired, e.g. a vessel of water, the air of a room. Let it be agreed to take n 'degrees' or steps between the two standard thermal states, then $\frac{v_2-v_1}{n}$ is the change in volume corresponding to one degree; and the number of degrees corresponding to the change in volume $v-v_1$ is

$$\frac{v-v_1}{\frac{v_2-v_1}{n}} \quad \text{or} \quad n\frac{v-v_1}{v_2-v_1}.$$

Therefore, if it is agreed to give the number t_1 to the first thermal state, the proper number for the temperature of the state to which the volume v corresponds is

$$t = t_1 + n\frac{v-v_1}{v_2-v_1}.$$

In this method for giving a numerical value to the temperature the following steps are arbitrary: (1) Choice of property of body, which varies with the temperature. (2) Choice of body to serve as 'thermometric substance.' (3) Choice of two standard thermal states. (4) Choice of number of degrees between the temperatures of these states. (5) Choice of number for first state. There are, consequently, an indefinite number of methods for giving numerical values to temperature. (See THERMOMETRY.) The scientific world has agreed to use numbers depending upon the change in volume or pressure of hydrogen gas initially at a pressure of 100 centimeters of mercury, the standard thermal states being those of melting ice and vapor rising from boiling water under normal atmospheric pressure, the number of degrees between the temperatures of these states being taken as 100, and the temperature of melting ice being taken as 0. (Therefore the temperature of the other standard state is 100.) Then, in the above formula, the numerical value of t becomes

$$t = 100\frac{v-v_0}{v_{100}-v_0}.$$

This is, then, the temperature on a constant pressure hydrogen thermometer, Centigrade scale.

[If change in pressure of a gas kept at constant volume is the property measured, the temperature is

$$t = 100\frac{p-p_0}{p_{100}-p_0},$$

where p_0, p_{100}, p are the pressures of the gas at 0°, 100°, t°. Experiments show that using hydrogen the temperature defined this way has the same numerical value as that defined by the change in volume at constant pressure.]

It is seen, then, that in order to give a numerical value to a thermal state, e.g. to that of water in a vessel, three measurements are necessary, those of the volume of the hydrogen when the bulb containing it is immersed in melting ice (v_0), in vapor rising from boiling water (v_{100}), and in the water (v). The fact should be emphasized that temperature is not 'measured' in the proper sense—the volume is measured; we have simply defined a method for giving a number to temperature. In ordinary laboratory practice mercury-in-glass thermometers are used; and divisions with numbers are marked on them, which are designed to correspond to proportionate increases in volume. These numbers have no meaning until the instrument is compared with a hydrogen thermometer; and a table of values connecting the numbers and the true temperatures—as defined above—is prepared. See THERMOMETER.

MECHANICAL EQUIVALENT OF HEAT. Since, in practice, heat-effects are rarely produced by mechanical work, the erg is not a convenient unit in terms of which to measure heat-energy. Almost invariably the energy required to produce a given heat-effect or the energy given out when the opposite effect occurs, is measured in terms of the change in temperature of water: thus, to find how much energy is required to make ice melt, a quantity of ice of known mass is put into a known mass of water at a known temperature, and the fall in temperature is observed. Therefore a practical unit for the measurement of heat-energy is the "energy required to raise the temperature of one gram of pure water from 15° to 16° Centigrade;" this is called the 'calorie.' The limiting temperatures must be defined, because it is not necessarily true that the same amount of energy would raise the temperature of one gram of water from 10° to 11°, or from 60° to 61°, as from 15° to 16°—in fact, it does not. This definition of a practical unit for measuring heat-energy is not an ideal one, because it makes the unit of energy depend upon so many extraneous conditions, viz. all those involved in the definition of temperature. It would be much better theoretically to choose some heat-effect which is independent of temperature, e.g. the energy required to make one gram of water boil away at normal atmospheric pressure; but such a unit could not be used practically. Experiments show that the amount of energy required to raise the temperature of one gram of water one degree at any temperature is nearly one calorie; and so for all practical purposes this is assumed. The number of ergs equivalent to one calorie has been called the 'mechanical equivalent of heat.' Its value is 4.187×10^7, according to the best determinations. There are in general two experimental methods for measuring this most important quantity: a mechanical one, depending upon the production of the rise of temperature of the water by a paddle revolving in it; an electrical one, in which the rise in temperature is produced by the heating effect of an electric current. In the first method the amount of work done is measured directly in ergs by a suitable dynamometer; in the second, the electrical quantities, current resistance, and electro-motive force are measured and the number of ergs calculated (energy $= E\,i\,t$). (See ELECTRICITY.) The mechanical method was first used accurately by Joule (1843-45), and more recently by Rowland (1878), and by Reynolds and Moorby (1897). (The last two investigators did not measure the calorie directly, however.) The electrical method was also first used by Joule; and within recent years it has been perfected by Griffiths (1893), Schuster and Gannon (1894), and Callendar and Barnes (1899). (For a full discussion of these experiments reference should be made to an article by Ames in *Reports of the*

International Congress of Physics, vol. i., Paris, 1900.) It should be noted that previous to the experiments of Joule both Carnot and Mayer had made calculations of the mechanical equivalent of heat, using the numerical values found for certain properties of gases.

SPECIFIC HEAT. It is found by experiment that the heat-energy required to raise the temperature of bodies varies greatly with the material of the body, with the external conditions, and slightly with the initial temperature. The number of calories required to raise the temperature of 1 gram of a substance from $t°$ to $(t+1)°$ under given conditions is called the 'specific heat' of that substance at $t°$ and under the specified conditions. Ordinarily, these conditions are those of constant atmospheric pressure; but it is possible to make the condition one of constant volume in the case of gases. (Methods for the measurement of specific heats are described under CALORIMETRY.) The specific heat of a gas at constant pressure is greater than that at constant volume by an amount equivalent to the energy required to expand the gas against the constant pressure, because, as has been stated, no appreciable work is necessary to produce the expansion of the gas itself. The ratio of these two specific heats of a gas is a most important constant for that gas, and may be determined directly by several methods. Its value for hydrogen, oxygen, and nitrogen is almost exactly 1.4. (See ELASTICITY.) The specific heat of a substance varies with its temperature. Its value for water at different temperatures is now known quite exactly owing to the recent experiments of Callendar and Barnes. Its value for solids at different temperatures is hard to obtain; and under ordinary conditions the variations are not important. Boron, carbon, silicon, and iron, however, have specific heats, which increase markedly with increase of temperature. The specific heat of a substance which can exist in several allotropic forms varies with the modification: thus at ordinary temperatures the specific heat of graphite is 0.202, of charcoal is 0.241, of diamond is 0.147. When a substance changes its state from solid to liquid and then to vapor, its specific heat changes too; thus the specific heat of ice is about 0.50, of water it is 1.00, of steam it is 0.48. Owing to this change in the specific heat of a substance when its molecular arrangement is altered, there is a curious property observed in the case of iron. If an iron wire is raised to a 'red heat' in a flame, then removed and allowed to cool, its color disappears, then reappears, and soon disappears again for good. This is called *recalescence*. It is due to the fact that as the iron first cools from its red heat it comes to a state when the molecules rearrange themselves owing to some internal condition of instability, and in so doing liberate energy, which is at once manifest by the iron becoming red-hot again, but at a lower temperature than before.

It was observed by Dulong and Petit that, if the specific heats of different solids are compared, there is an approximate connection between them and the atomic weights of the solids. In fact, the product of the specific heat of a substance in the solid condition and its atomic weight is approximately the same for all substances, viz. 6.4. This product for any substance is called its 'atomic heat,' because by the definition of 'atomic weight' it is proportional to the heat-energy required to raise the temperature of one atom one degree. The agreement between the values of the atomic heat for different substances is not very exact, partly no doubt due to the fact that the conditions of temperature under which the specific heats were measured were not such as to make the other conditions of the solids comparable, e.g. one solid is nearer its melting-point than is another at the same temperature. This law of Dulong and Petit has been extended by Woestyn to the idea of 'molecular heats;' he thinks it probable that the heat-energy required to raise the temperature of a molecule one degree equals the sum of the amounts of energy required to raise the temperature of the individual atoms. This extension of the law is not verified in the case of most compounds.

TABLE OF SPECIFIC HEATS

SUBSTANCE	Specific heat	Temperature
Water	1.000	15°C
Mercury	0.033	20
Copper	0.092	50°
Iron	0.110	50°
Zinc	0.093	50°
Platinum	0.032	50°

SPECIFIC HEATS OF GASES

	Constant pressure	Constant volume
Air	0.2374	0.1721
Carbon dioxide	0.2169	0.1730
Hydrogen	3.4090	2.402
Nitrogen	0.2438	
Oxygen	0.2175	

EXPANSION. In general when heat-energy is added to a body its volume is changed; and experiments prove that an approximate relation connects the change in volume of any substance and its change in temperature. If v_0 is the volume at 0°, and v is the volume at $t°$, the external pressure remaining constant, $v - v_0 = v_0 \beta t$ or $v = v_0\ (1 + \beta t)$, where β is approximately a constant for any one substance (with certain marked exceptions). It is called the *coefficient of cubical expansion at constant pressure*, referred to 0°. [A more exact relation would be $v = v_0\ (1 + a_1 t + a_2 t^2 + a_3 t^3 + \text{etc.})$.] If the change in length of a linear dimension of the body—e.g. an edge of a cube, if it is in that form—is considered, it will satisfy a similar formula. Let l and l_0 be the final and initial lengths; then $l = l_0\ (1 + \alpha t)$, where α is called the *coefficient of linear expansion*. If the body is in the form of a cube, whose edges have the length l_0 at 0° and l_1, l_2, l_3, respectively at $t°$, $v_0 = l_0^3$, $v = l_1 l_2 l_3$. Hence, if

$$l_1 = l_0\ (1 + \alpha_1 t),\ l_2 = l_0\ (1 + \alpha_2 t),\ l_3 = l_0\ (1 + \alpha_3 t)$$

$$v = v_0\ [1 + (\alpha_1 + \alpha_2 + \alpha_3)\ t + (\alpha_1 \alpha_2 + \alpha_2 \alpha_3 + \alpha_3 \alpha_1)\ t^2 + \alpha_1 \alpha_2 \alpha_3\ t^3].$$

But since α_1, α_2, α_3 are all extremely small in general this may be written $v = v_0\ [1 + (\alpha_1 + \alpha_2 + \alpha_3) t]$; and it follows that $\alpha_1 + \alpha_2 + \alpha_3 = \beta$. If the body is isotropic, $\alpha_1 = \alpha_2 = \alpha_3 = \frac{1}{3}\beta$; but if the body is crystalline the coefficients of linear expansion in different directions may be different, and may even be of opposite sign. In this last case it might happen that the contraction in one direction would be so great as to make β negative, i.e. produce a diminution of volume with rise in temperature. The change in volume of

water as the temperature changes is peculiar, inasmuch as it decreases while the temperature increases from 0° to about 4° C., and then it increases as the temperature continues to increase. This fact plays a most important part in the economy of nature, as, owing to it, when the temperature at the surface of a pond or lake falls below 4°, the cold water, being lighter, stays on the surface, and ice is formed. Ordinarily, of course, the colder a liquid is the denser it is; and so, if the surface of a liquid standing in a tall vessel is cooled, the top layers will sink and the lower ones will rise. There will thus be *convection currents* until the whole liquid is at the same temperature. Similarly, if the bottom of a vessel of an ordinary liquid is warmed, there will also be convection currents. The motion of these liquid masses is evidently due to the force of gravity, making the denser liquid come below the lighter. The coefficients of cubical expansion at constant pressure are different for different liquids and solids; but for all gases they are practically the same, viz. 0.003662. This most important property of gases is called the 'law of Gay-Lussac,' although its accurate verification is due to Regnault. If Boyle's law is true for a gas, viz. at constant temperature the product of the pressure and volume of a given mass of gas remains constant, it follows at once that the change in pressure of a constant volume of a gas as the temperature is raised from 0° to $t°$ obeys the law $p = p_0(1 + \beta t)$, where p_0 is the pressure at 0°; p that at $t°$; and β is the same coefficient as that for changes in volume, viz. 0.003662. The law that the coefficient of change in pressure at constant volume for all gases is practically the same is sometimes called the 'law of Charles.' If both the pressure and temperature of a gas are changed—assuming Boyle's and Gay-Lussac's laws—it may be shown that under all conditions $\frac{p}{\rho\ (t + 273)}$ is a constant for the gas, where ρ is the density at $t°$ and pressure p. This may be written

$$\frac{pv}{m\,(t + 273)} = \mathrm{R},$$

where R is a constant for any one gas, and evidently equals $\frac{1}{273}\frac{\rho}{\rho_0}$ where ρ_0 is the density of the gas at 0° C., and at pressure p. It is evident further from the formula that, *if it could be supposed to apply to gases at very low temperatures*, at $t = -273°$, $pv = 0$, an equation which in itself is meaningless. A lower value of t would lead to a negative value for pv, which is absurd. Therefore, the temperature —273 C. is sometimes called 'absolute zero on the gas scale of temperature;' and $t + 273$, or T as it is written, is called the 'temperature on the absolute gas scale.' (A more accurate determination of the coefficient of expansion makes the absolute zero —273.1° C.)

Methods for the measurement of coefficients of expansion are described in all treatises on heat. See Preston, *Theory of Heat*.

COEFFICIENTS OF CUBICAL EXPANSION

SOLIDS

Platinum	0.000027
Copper	0.000051
Steel	0.000033
Brass	0.000056
Glass	0.000027
Zinc	0.000087

LIQUIDS

Mercury	0.000182

GASES

For all gases	.003662 approximately

CHANGES IN STATE. FUSION AND VAPORIZATION. If a flame is applied to a vessel, such as a glass beaker, in which there is a block of ice at a low temperature, at first the temperature will rise, but finally a temperature is reached when there is no longer any change and the ice begins to melt. If during the process the mixture of ice and water is stirred the temperature will remain unaltered until all the ice is melted; then the temperature will again rise until the water begins to boil, when the temperature is again constant until all the water is boiled away; and then the temperature of the steam will rise. Conversely, if the steam is cooled, it will begin to condense into water at the same temperature as that at which it boiled, *provided its pressure is the same;* but so long as it is condensing there is no change in temperature; then when all is condensed the temperature of the water will fall until it begins to freeze, as it will at the same temperature as that at which the ice melted, *provided the pressure on it is the same;* and during the process of freezing there is no change of temperature, but when it is completed there is again a fall. This course of events is common to all crystalline solids; but many solids, such as waxes, have no definite temperature at which they melt, but pass through a pasty condition from solid to liquid, the temperature continually rising; and the converse happens when they become solids. There is, then, in the case of ice and similar bodies, a temperature at which the solid and liquid states are in equilibrium together, unless there is addition or withdrawal of heat-energy. This is called the 'fusion-point.' There is also a temperature at which the liquid and the vapor are in equilibrium unless there is addition or withdrawal of heat-energy. This is called the 'boiling-point.' Both these equilibrium temperatures vary with the pressure on the bodies. As the pressure is increased on a liquid its boiling-point is raised, and conversely, e.g. in the case of water, a change of pressure from 76 to 77 centimeters of mercury changes the boiling-point from 100° to 100.37°.

FUSION AND BOILING POINTS

Fusion-point		Boiling-points at normal pressure	
Platinum	about 1800° C.	Sulphur	444.5° C.
Copper	" 1096	Mercury	357.
Gold	" 1092	Water	100.
Silver	" 985	Ethyl alcohol	78.
Zinc	415	Ethyl ether	34.6
Bismuth	268	Carbon dioxide	−79.
Sulphur	115	Oxygen	−183.
Mercury	−39	Nitrogen	−194.
		Hydrogen	−238.

As the pressure on most solids is increased, their melting-point is increased also; but there are certain exceptions, viz. those substances which on melting occupy smaller volumes in the liquid than in the solid states. Such solids are ice, cast iron, bismuth. This change in the freezing-point is, however, most minute. In the case of ice, the melting-point is changed from 0° to —0.0075° C. if the pressure on the ice is increased from one to two atmospheres. The phenomenon of 'regelation' is due to this last fact. When the pressure on a piece of ice is

increased its melting-point is lowered. Therefore, if two blocks of ice at 0° are pressed together, the ice under pressure at the point of contact has a melting-point less than 0°, but being at 0° is at a temperature which is higher than its melting-point, and so melts. The water which results from this is at a temperature lower than 0°; and so as it flows out from under the pressure it freezes again, because now its freezing-point is 0°. The motion of glaciers depends on this phenomenon.

The presence of nuclei greatly facilitates the processes of solidification, boiling, and condensation. A drop or a bubble cannot be formed without some nucleus (see CAPILLARITY); and a liquid can be cooled far below its freezing-point if there is no nucleus and if the liquid is not disturbed or jarred. A liquid exposed in an open vessel will evaporate, i.e. will pass slowly into the form of vapor, at all temperatures below its boiling-point. If, however, a large closed vessel is placed over the one containing the liquid, the evaporation will soon cease apparently—there is equilibrium between the liquid and the vapor. The process does not in reality stop; but the evaporation of the liquid is exactly balanced by the condensation of the vapor. Experiments show that this state of equilibrium is reached at a certain temperature when the pressure of the vapor is a definite quantity, viz. at the 'boiling-point' for that pressure; if the temperature is changed, so is the pressure which corresponds to equilibrium. If the temperature in the above experiment is lowered, some vapor will condense; illustrations of this are the formation of dew, formation of drops of water on ice-pitchers, etc. Again, if in the above experiment the volume of the space over the liquid is made smaller, some of the vapor will be condensed. Thus there are two methods for the liquefaction of a gas or vapor: to lower the temperature and to decrease the volume. It was established by Andrews in 1869 that a vapor cannot be liquefied by any decrease in volume, however great, unless the temperature is below a certain limit, which is different for different substances, and which is called the 'critical temperature.' But by lowering the temperature sufficiently and by making the volume small enough, all known gases have been liquefied with the exception of helium. (See LIQUEFACTION OF GASES.) The critical temperatures of a few gases are given below:

CRITICAL TEMPERATURES

Carbon dioxide	30°.92	Hydrogen	—234
Sulphur dioxide	156.	Oxygen	—118
Sulphuric ether	194.4	Nitrogen	—146
Water	365		
Ammonia	130		

If substances are dissolved in a pure liquid, both its freezing and its boiling points are altered; the former is lowered and the latter is raised, the amount of the change varying directly with the quantity of substance dissolved. In most cases, however, both the solid and the vapor formed are those of the pure liquid. If the dissolved substance is volatile, then it will evaporate also. Common salt and water serve as an illustration. If salt is added in small amounts to a vessel of water, a time will come when the water will no longer hold the salt in solution, but will deposit it; the solution is said to be 'saturated.' The amount of salt required to produce saturation varies directly with the temperature. If an unsaturated solution has its temperature lowered below 0°, the freezing-point of the solution will finally be reached, pure ice will separate out, leaving the solution more concentrated; the freezing-point of this solution is lower than that of the first; and so as the temperature gets lower and lower, the solution becomes more and more concentrated until finally it is saturated. If now heat-energy is removed, ice will form, but salt will be deposited also in equivalent amounts; this mixture of ice and salt is called the 'cryohydrate,' and the temperature of its formation is —22° C. (Other salts and liquids have different cryohydrates and different temperatures of formation.) In this cryohydrate of common salt there are 23.8 parts by weight of the salt and 76.2 parts of ice. Therefore, if a mixture is made of salt and ice in this proportion, it will form a solid whose melting-point is —22° C.; and if it actually is at the temperature —5° or —10°, it will of course melt, and in so doing heat-energy will be abstracted from surrounding bodies, because energy is required for two reasons, to melt the ice and to make the salt dissolve in the water. For this reason such a mixture is called a 'freezing-mixture.'

The fact that heat-energy is required to make a solid melt or a liquid evaporate is familiar from many experiments. Similarly heat-energy is liberated when a liquid freezes or vapor condenses. The number of calories corresponding to the change in state of one gram of a substance under a definite pressure is called the *latent heat* for that change at the given pressure. Similarly, when one substance dissolves in another, there are as a rule changes in temperature showing that heat-energy is liberated or absorbed. The 'heat of solution' is defined to be the number of calories produced when one gram of a substance dissolves in a great mass of a given solvent, a quantity so great that any further increase in it would not affect the heat-energy liberated or absorbed. Values for latent heats and heats of solution are given in the following tables:

LATENT HEATS

SUBSTANCE	Fusion	SUBSTANCE	Vaporization
Water	80.02	Water	536.6
Sulphur	9.37	Ammonia	297.
Benzene	30.85	Benzene	92.9
Mercury	2.82	Ether	90.
Silver	21.07	Chloroform	58.5

HEATS OF SOLUTION IN WATER

Ammonia gas	+495.6
Ethyl alcohol	+ 55.3
Sulphuric acid	+182.5
Caustic potash	+223.3
Sodium chloride	— 18.22
Potassium chloride	— 59.7
Silver chloride	—110.

+ Means rise in temperature.
— Means fall in temperature.

There are, of course, other changes of state than those mentioned; among these are sublimation, when a solid passes directly into the state of vapor; dissociation of a gas, when the molecules of a gas break up into other parts; etc. It is found, however, in all these cases that there will be equilibrium at a definite temperature only when a certain pressure is reached, and conversely.

TRANSFER OF HEAT. There are three processes

by which the energy used in producing heat-effects is conveyed from one point to another: convection, conduction, radiation. It should be particularly noted that in all cases a difference of temperature is essential for a transfer of energy, and that it is the body at the lower temperature which gains heat-energy, while the body at the higher temperature loses it. *Convection* has already been described. It consists in applying a flame or 'source of heat' to the lower portion of a column of some fluid; this portion expands, becoming less dense; then under the influence of gravity it rises to give place to some heavier portion of the fluid above it. The motion of the wind, of draughts of smoke in chimneys, of water in hot-water systems of heating, etc., are illustrations of this process. *Conduction* is illustrated when one end of a long metal rod is raised to a high temperature, while the other is maintained at a lower one. There may be observed a steady increase of temperature from the latter end up to the former; the heat-energy required to produce this temperature coming from the 'source of heat' which keeps the hot end at its high temperature by a process of 'conduction' from particle to particle down the rod. Some bodies conduct better than others, meaning that the effect of the source of heat at the hot end is felt farther down the rod. Metals are all good conductors; but silver, copper, and aluminum are the best. Woods and cloths are poor conductors; so are all liquids, with the exception of molten metals, and gases also, relatively to their volumes. The principle of the miner's safety lamp depends upon conduction, because the temperature of the gases escaping from the flame through the gauze envelope of the lamp is made so low by the conduction away of heat-energy by the gauze and the metal base that the exterior gas is not ignited. *Radiation* is the process by which heat-energy is conveyed from one body to another by a wave-process in the luminiferous ether. (See RADIATION; ABSORPTION; ETHER.) Illustrations are afforded when the hand is held beside a stove or exposed to the sun. All bodies in the universe, so far as is known, are emitting these ether-waves, owing to vibrations inside the molecules. These waves have lengths varying from less than 0.00002 of a centimeter to a few hundredths of a millimeter. They carry energy; and if they are absorbed by any body upon which they fall, this energy is as a rule distributed throughout the minute portions of the body, and it manifests heat-effects. The total amount of energy radiated by a body increases as the temperature is raised; and, further, as the temperature rises, the body emits shorter and shorter waves—finally the body may become visible. If two bodies are allowed to radiate to each other, each loses energy by radiation and gains it by absorption until finally there is equilibrium of temperature. It may be shown (see RADIATION) that the radiating and absorptive powers of any body are the same at any one temperature; and in general a body which is a good absorber is a good radiator, e.g. a body painted black; while, if a body is a poor absorber, and therefore a good reflector, it is a poor radiator, e.g. a piece of polished metal. Some bodies are transparent to ether-radiations of certain wave-lengths and opaque to others; they are called diathermanous if the waves which are transmitted by them carry a large amount of energy, which may be transformed into heat-energy if absorbed. See DIATHERMANCY.

Consult: Preston, *Theory of Heat* (London, 1896); Tyndall, *Heat as a Mode of Motion* (6th ed. London, 1880); Maxwell, *Theory of Heat* (London, 1875). For heat considered as a factor of organic evolution, see EVOLUTION.

HEATH (AS. *hæþ*, Icel. *heiþr*, Goth. *haiþi*, OHG. *heida*, Ger. *Heide*, heath, OWelsh, Bret. *coit*, Corn. *cuit*, forest, Gall. *cēto-* in *Cēto-briga*, *eto-cētum*, Lat. *cetum* in *bu-cetum*, cow-pasture, *quer-cetum*, oak-forest). A term of varied significance, applied originally to various members of the Ericacæ (see below), and long used to designate areas covered by such plants. It has been still further extended to include most sterile, uncultivated tracts covered with low shrubs. In its more proper ecological sense, however, a heath may be defined as a plant society on sterile and commonly dry soil in which the dominant plant types are evergreen shrubs, chiefly ericads or ericad-like plants. The heath, defined in this way, is much less common in America than in Europe, although in the Northern United States and Canada small areas of low evergreen shrubs are often found in which the bearberry (Arctostaphylos) and junipers dominate. Small heath areas are also found in mountain (even alpine) districts. In the far northern regions and sometimes locally in the Northern States, habitats like the above are often covered with coarse mosses like Polytrichum or lichens of the genus Cladonia (including the reindeer lichen); these areas may be called moss or lichen heaths, since the soil conditions are those of the true heath, though the exposure is perhaps too great for the shrubs.

The origin of the heath is twofold: it may arise from a moor or undrained swamp (q.v.), or from a dry sandy area, as a beach or dune. This fact is of great ecological interest, since so far as water content is concerned, a dune is xerophytic, while a swamp is hydrophytic. That dune, heath, and moor are closely related as to their ecological conditions, however, is shown not only by the twofold origin of the heath, but also by the fact that all typical dune, heath, and moor plants have identical and xerophytic structures (see XEROPHYTES); not only this, but the dominant plant families, conifers and ericads, are the same throughout. On the dune transpiration is great, perhaps because of the excessive exposure; on the heath and in the swamp, transpiration is great in relation to absorption, probably because of the soil acids and the relative absence of bacteria. Hence in all three cases only those plants can thrive which are able to reduce transpiration by protective structures, and those structures are peculiarly prominent in conifers and ericads.

The heaths are small shrubs, distinguished by a calyx of four leaves and a bell-shaped or ovate corolla. The leaves are small, linear, and evergreen. The genus has been separated by some botanists into a number of genera, but the old name, Erica, is still commonly retained. The name heath, however, is in popular language extended to many plants of genera nearly allied to Erica. The little shrub which chiefly covers the large tracts named moors or heaths (Ger. *Haide*) in Great Britain and on the Continent of Europe, is the common ling or

heather (*Calluna vulgaris*), the only known species of the genus Calluna. It is also found in a few places in the Eastern United States, where it was probably introduced. It is found on arid places, and also in bogs. The flowers, which have much the appearance of being in spikes, are of a lilac rose color, rarely white. They afford abundance of honey, and the beehives are therefore transported to the moors when the heather is in bloom. In bogs it contributes much to the formation of peat. In some of the Hebrides a decoction of heath is used for tanning leather. The plant is applied to various other uses in the Highlands of Scotland. About 500 species of Erica are known, and these, with few exceptions, are natives of the south of Africa. None are found in America. The British Isles produce seven species, of which some have been found only in Ireland and some in the southwest of England; cross-leaved heath (*Erica tetralix*) and fine-leaved heath (*Erica cinerea*) are common plants in most parts of Great Britain, and, like most of the genus, are very beautiful when in flower. The heather-bells of Scottish song are the flowers of one or both of these species. *Erica Mediterranea* and *Erica carnea*, common in the southern parts of Europe, are very frequent ornaments of British flower borders, hardy plants, producing their flowers in great profusion in April. Many of the African species, remarkable for the size and beauty of their flowers, are much cultivated in greenhouses. Some of the South African or Cape heaths attain in their native region a much greater size than any European heath. The roots of *Erica scoparia* are known as bruyere, and furnish the true brier pipes of France.

HEATHER.

HEATH, James (1629-64). An English historian, born in London, and educated at Westminster School, and for two years at Christ Church, Oxford, from which he was expelled by the visitors from Parliament in 1648. He was an ardent Royalist, and lived in exile with Charles II. 'Carrion Heath,' a 'dreadfully dull individual,' according to Carlyle, wrote: *A Brief Chronicle on the Late Intestine War* (1661); *The Glories and Magnificent Triumphs of the Blessed Restitution of King Charles II.* (1662); *Flagellum: or, the Life and Death, Birth and Burial of Oliver Cromwell* (4th ed. 1669).

HEATH, Nicholas (c.1501-79). An English prelate and jurist, born in London, and educated at Saint Anthony's, in London, possibly at Corpus Christi, Oxford, and certainly at Christ's College, Cambridge. In 1539 he was made Bishop of Rochester. He 'oversaw and perused' the Great Bible of 1541, and was made Bishop of Worcester after Hugh Latimer's resignation. In 1550 he refused to accept Cranmer's form for the Prayer-Book, and was imprisoned and deprived of his see, but was restored at the accession of Mary, and in 1555 became Archbishop of York. When Mary died, Heath did all in his power to bring about the immediate and peaceful accession of Elizabeth; but when the question of Elizabeth's supremacy came before Parliament, Heath opposed her claim to the headship of the English Church, and later refused to take the oath required by the Act of Supremacy. For this contumacy he was again deprived of his see (1559), imprisoned for a short time in the Tower, and then permitted to retire, on the understanding that he was not to meddle with politics, profane or ecclesiastical.

HEATH, Sir Robert (1575-1649). An English jurist, born at Brasted, in Kent, and educated at Tunbridge and at Saint John's, Cambridge. He studied law, rose rapidly, became Solicitor-General in 1621, was knighted in the same year, and in Parliament (1624-25) showed himself a thorough Royalist, and was appointed Attorney-General as a reward for his services. In this office he was active and severe; he arrested in 1629 Holles, Eliot, Selden, and other members of the Commons, arguing that privilege did not protect after the close of a session, and carried their prosecution through successfully, and was equally strenuous and successful in his prosecutions before the Star Chamber. But there was a rumor that he was Puritan in secret, and he was removed without cause. But his loyalty did not waver; he accompanied the King to York in 1642, and later to France, where he died at Calais. Consult the autobiography in vol. i. of the *Philobiblon Society Miscellany* (New York, 1861).

HEATH, William (1737-1814). An American soldier. He was born at Roxbury, Mass., and was brought up on a farm, upon which he lived up to the outbreak of the Revolutionary War. He was a member of General Court of Massachusetts in 1761, entered enthusiastically into the political movement that culminated in the Revolution, and from 1771 to 1774 was a member of the committees of Safety and Correspondence. In the latter year he was elected to the Provincial Congress. His interest in the organization of the militia, of which he had made a special study, obtained for him in December, 1774, an appointment as a brigadier-general of militia, and as such he was present at the British retreat from Concord after the battle of April 19, 1775. Thereafter he was made major-general of militia, and on June 22, 1775, was commissioned by Congress a brigadier-general of the Continental troops. In March, 1776, he was ordered to New York; on August 9th was promoted major-general, and after the battle of White Plains, in the following October, was placed by Washington in command of the troops in the Highlands. In 1777 he became commander of the Eastern Department, with headquarters at Boston, and in June, 1779, was transferred to the command of Hudson River posts, where, with the exception of his coöperation with the French in Rhode Island in 1780, he remained until the close of the war. After the war he was a member of the Massachusetts Convention that ratified the Federal Constitution, was a State Senator in 1791-92, and was probate judge of Norfolk County in 1793. In 1806 he was elected Lieutenant-Governor of Massachusetts, but declined to serve. His *Memoirs*, which contain

much valuable material on the Revolutionary period, were published in 1798 by authority of Congress, and were last republished under the editorship of William Abbatt in New York in 1901.

HEATH'COAT, John (1783-1861). An English inventor, born at Duffield, near Derby. He worked with a hosier, and later with a stocking-maker and frame-smith at Nottingham. In 1808 and 1809 he patented his complicated machinery for the manufacture of lace. His factory at Loughborough was attacked by the Luddites, and most of his machinery and lace destroyed. Rather than continue at Loughborough, Heathcoat refused an award of £10,000 for damages. He built a new plant at Tiverton, and for twenty-six years (1832-59) represented that constituency in Parliament. He built schools at Tiverton, and planned many charities, which were carried out by his daughters.

HEATH-COCK, HEATH-HEN. See Blackcock; Grouse.

HEATH'COTE, Caleb (1665-1721). An American merchant, born in England, where his father was Mayor of Chester. He established himself with his uncle, Capt. George Heathcote, a large ship-owner, in New York, and upon Heathcote's death inherited his fortune. He was a zealous churchman, and was one of the petitioners for a license to build the first Trinity Church. He held many offices, among them those of Mayor of New York (1711-14); judge of Westchester County; commander-in-chief of the forces of the Colony; surveyor-general of the province; and receiver-general of the customs for all North America. His large estates near Mamaroneck were erected into the manor and lordship of Scarsdale in 1701, and on his death passed with his title to his son.

HEATHEN CHINEE, The. A celebrated satiric poem by Bret Harte (1869), in the metre of the threnody in Swinburne's *Atalanta in Calydon,* selected, as Harte says, because "it was just the kind of thing which Truthful James would be the last man in the world to adopt in expressing his views." The poem is based on the imitative faculty of the Chinese, especially in cheating at cards, and its points appealed at once to the East as well as the West, although it was originally intended only as a local satire on Western political conditions. It is probably the best-known and most-quoted of the author's writings.

HEATHER, hĕth'ẽr. See Heath.

HEATHER-BLEATER. A provincial name in England for the common snipe (q.v.), in allusion to the love-cry of the cock bird in the breeding season.

HEATH'FIELD, George Augustus Eliot (or Elliott), first Baron (1717-90). A British soldier, born at Stobs, Roxburghshire, Scotland. He was educated at the University of Leyden, afterwards attended the French military college of La Fère, and served in the War of the Austrian Succession, being present at the battles of Dettingen and Fontenoy. As colonel of a regiment of light horse, he took part in the Seven Years' War in the years 1759-61. In 1762 he was second in command in the English expedition to Cuba, and for his services there was raised to the rank of lieutenant-general. In 1775, when, because of the *pacte de famille* between France and Spain, it was thought very probable that one or both of these countries, taking advantage of the rebellion in America, would attack England, an experienced soldier was deemed necessary for the command of Gibraltar, and Eliot received the appointment. Ample time was given him to repair the defenses, as it was not until 1779 that the Spanish undertook a regular siege. In the attacking force of French and Spaniards were the greatest engineers of the age, but their efforts to reduce the stronghold, including the terrific cannonade with the floating batteries of the Chevalier d'Arcon in 1782, were futile. Eliot and his little garrison, though at the verge of starvation, because of the blockade, held out until relief came from a force in command of Lord Howe, who succeeded in breaking through the Spanish lines with supplies. At the conclusion of peace, in 1783, Eliot returned to England, where he was richly rewarded for his bravery. He was made Knight of the Bath, and in 1787 advanced to the peerage as Lord Heathfield, Baron of Gibraltar. Consult Drinkwater, *History of the Siege of Gibraltar* (new ed., London, 1844).

HEATING AND VENTILATION. These topics are so closely related in sanitary and engineering discussions, as well as in the actual planning and erection of buildings, that they are generally considered together. Where artificial heat is seldom if ever required little attention need be given to ventilation, since the people spend most of their time either out of doors or in loosely constructed buildings, with plenty of exposure to the outer air. In cold climates ventilation becomes as essential for complete healthfulness as heating is for comfort, a fact that is not generally recognized; moreover, where much artificial heat is required, the fresh air provided as a part of ventilation must also be heated, which may add greatly to the expense of fuel. In general it may be said that the object of heating is to provide a uniform moderate temperature, and the aim of ventilation is to displace foul air with pure. Both heating and ventilation have an important relation to the moisture of the air, hot-air furnaces, for instance, giving an over-dry air, while the atmosphere of a poorly ventilated, over-crowded room gradually becomes saturated with watery vapor.

Heating has for its standard in the colder parts of the United States and in Canada a temperature of about 70° Fahrenheit, against some 60° in England. The difference is largely due to the more uniform and humid climate of England. Heat for warming is produced by the combustion of fuel (q.v.), except in those few rare cases where electricity generated by water-power or the stored heat from underground waters (as at Boise, Idaho) is utilized. Coal and wood are most commonly employed as fuel, but oil and gas are also used. Open fireplaces, stoves, or furnaces may be employed for burning any of the fuels named, except that oil is rarely if ever burned in open fireplaces.

The methods of heating are classified as direct and indirect radiation. Direct radiation takes place when the heat is generated either in the room, as with open fireplaces, stoves, and furnaces, or when hot water or steam is produced by means of central furnaces and then conveyed through pipes to radiators located in the various compartments to be heated. Indirect radiation

involves the bringing in of air warmed by passing it over some central heated surface, generally a furnace, but sometimes a coil of steam or hot-water pipes. It will be noted that direct radiation heats the air already in the room, while indirect radiation brings in heated air. Thus, indirect radiation may be a means of ventilation, also, by seeing that pure air is secured for heating and distribution. The same end may be effected by locating the heating surface in the room and passing the fresh air over it, which is known as direct-indirect radiation. Strictly speaking, fireplaces only heat solely by direct radiation, i.e. by sending the heat out in straight lines until it is deflected or absorbed by something other than air. With stoves and radiators most of the heat is made available by convection, i.e. by heating the air that impinges upon or passes over the heated surface.

History. The first application of artificial heat consisted, most likely, in lighting a fire of dried sticks and leaves in a grove, a cave, or other natural shelter. Where tents or wigwams came to be erected, the fire would be lighted on the middle of the floor, with perhaps a hole in the roof for smoke to escape. The Romans warmed their apartments chiefly by portable stoves, without any regular exit for the smoke and fumes. A brazier of charcoal is still the chief means of heating sitting-rooms in houses in Spain and Italy, which are in general without chimneys, which are comparatively a modern invention. The early fireplaces were without chimneys and the flues extended only a few feet up in the thickness of the wall. They were then turned out through the wall, to the back of the fireplace, the openings into the outer air being small oblong holes. There is no evidence of chimneys earlier than the twelfth century, and brick was not used for their construction till late in the fifteenth century. Of the modern methods of heating dwellings by fireplaces, stoves, furnaces, steam and hot-air apparatus, the fireplace is the oldest, having been employed during the Middle Ages, and becoming, in Northern Europe, an important feature of the architectural development. The fireplace, at first wholly of masonry, was afterwards framed in elaborately carved oak, and the settle, which soon became an essential part of mediæval furniture, was built into the angle of the chimney. Stoves are said to have been used for the first time in Alsace, in 1490, but they did not come into general use as a means of heating until three centuries later. In 1744 Benjamin Franklin invented a cast-iron open heater, which projected out from the chimney, and so radiated heat into the room from the back and sides as well as from the front. The cast-iron box stove was invented in 1752. Early in the nineteenth century cylindrical sheet-iron stoves were made. About 1830 the first base-burner was put upon the market in America, and since that time the different types of stoves have been developed, by successive patents, to their present state of perfection.

The first attempt to construct a hot-air furnace for supplying pure heated air to rooms was probably made by Franklin. In 1744 he built a box-shaped stove for burning wood. "The smoke escaped over the top of a flat chamber behind its fire, passing downward between it and the real back of the stove, and thence into the chimney. This flat, hollow chamber communicated underneath the stove with a tube opening into the external atmosphere, and a quantity of air was thus passed through the flat chamber into the room through small holes left in the sides." Early in the nineteenth century the method of warming by hot air was developed. The first hot-air furnace in New England is said to have been built in Worcester, Mass., in 1835. Heating by hot water was an invention of great antiquity. According to Seneca, the baths of Rome were warmed by water running through brass pipes, which at one point were heated in a fire. With the fall of Rome this method of warming the air seems to have been forgotten, for we next hear of it as a fresh discovery made in 1777 by M. Bounemain for warming the hot-houses of the Jardin des Plants in Paris. Heating by hot water was introduced into England in 1816 by the Marquis de Chabonne. It was used in Canada for many years before it became popular in the United States, where it was not generally adopted till the last quarter of the nineteenth century. Heating by steam was proposed, in the middle of the eighteenth century, by William Cook, of Manchester, England. In the United States it was not introduced till nearly a century later. The first building in America warmed in this way was the Eastern Hotel of Boston, and the first factory the Burlington Woolen Mill, Vermont.

Fireplaces. The open fire glowing in a grate, which is still the prevalent mode of warming dwelling-houses in Great Britain, and the more common wood fire in America, have an air of cheerfulness and comfort that make them almost objects of worship. Unfortunately, only 10 to 25 per cent. of the value of the fuel burned in fireplaces is utilized as heat; such fires give a partial kind of warmth, heating the side of the body next to them, but leaving the rest cold, and producing draughts into the rooms which are anything but safe or agreeable. Nevertheless, the fireplace holds its own, for besides its cheerfulness and sentimental features it is, or may be, ornamental, while as an efficient aid to ventilation it is most useful. The substitution of brick-lined for non-lined fireplaces conserves some of the heat. Much also depends upon the shape of the fire-box, or grate itself, where coal, rather than wood, is burned. The chief object is to present as large a surface as possible of glowing fire to the front in order to secure as much radiant heat as possible. With this view, the grate is made long and deep, in proportion to its width from front to back. This principle, however, is carried too far in many grates. The stratum of fuel is too thin to burn perfectly, especially in the narrow angles at the sides, where the coal seldom gets to a red heat, and is only warm enough to distill away in smoke. Such fires are constantly going out, and are further from being economical than a square box.

Placing grates almost on a level with the floor is a mistake. The floor and the lower part of the person receive no share of the radiant heat. The chimney throat, instead of a gulf drawing in a constant wide current of the warm air of the room, and causing draughts from windows and doors toward the fireplace, should just be sufficient to admit the burned gases and smoke. Fireplaces are sometimes so arranged in connection with an air-inlet as to introduce a current of

warmed air into the room. In cold climates fireplaces must be supplemented by more effective means of heating.

A STOVE is simply an inclosure of metal, brick, or earthenware, heated by burning a fire within it, and then giving out its heat to the air by contact, and to surrounding objects by radiation. The simplest, and, so far as mere temperature is concerned, the most effective and economical of all warming arrangements is simply a hollow cylinder or other form of iron standing on the floor, closed at top, and having bars near the bottom on which the fire rests. The door by which the coals are put in being kept shut, the air for combustion enters below the grate, and a pipe issuing from near the top carries the smoke into a flue in a wall. If this pipe is made long enough by giving it, if necessary, one or more bends, the heated gases from the fire may be made to give out nearly all their heat into the metal before they enter the wall; and thus the whole heat of the combustion remains in the room. The great objection to this form of stove is that the metal is apt to become overheated, which not only gives rise to accidents, but deprives the air of or increases its capacity for moisture, thus parching the skin and lungs, unless means be taken to supply the necessary moisture. An evaporating-pan or other contrivance is an essential part of stoves and furnaces. Improvements on this simple and rude form of stove aim at avoiding a high heat in the warming surface, by inclosing it in several casings, so as to enlarge the heated surface.

FURNACES. In ordinary hot-air furnaces the fire is burned in a small compartment within the inner case, and the air is warmed by circulating between the inner and outer cases. When placed in the apartment or hall to be warmed, the outer casing has perforations about the top for the issue of the warm air. For heating churches and large buildings generally the furnace is placed in a separate room or cellar, and the warm air is conveyed to the different parts of the building in pipes or flues, while fresh air is drawn to the furnace through a fresh-air inlet and duct from outside the building to the openings in the outer casing of the furnace. The heat-pipes are generally of tin, suspended from the ceiling of the cellar, or from the beams supporting the floor above, in their horizontal course, and carried upward in the partitions to the higher floors to be heated.

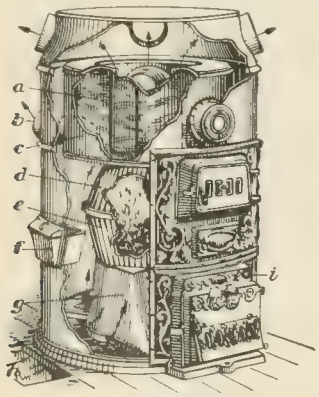


FIG. 1. FURNACE

a, division-plate; *b*, smoke pipe; *c*, steel plate radiator; *d*, body; *e*, fire-pot; *f*, water-pan; *g*, ash-pit; *h*, cold-air duct; *i*, dust-flue.

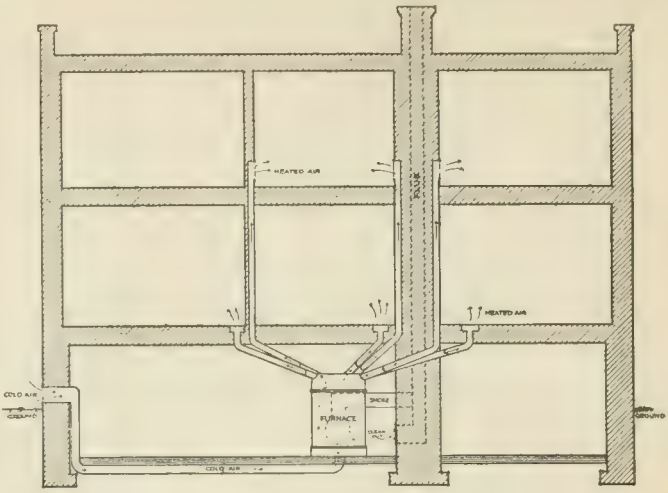


FIG. 2. HOT-AIR SYSTEM.

The heat is admitted to the several rooms through registers. Each room to be heated should have a separate line of heat-pipes, provided with a damper at the furnace. Each register should be supplied with a damper, so the heat may be regulated in the room. The several small openings in the registers should have an aggregate area at least as great as the cross sectional area of the heat-pipe. The supply of fresh outdoor air to be heated and distributed should be ample, for otherwise air will be drawn in from the cellar or some room in the house. The fresh-air box should be as nearly air-tight as possible, and both it and the inlet should be kept well away from any source of contamination. Economy and health alike demand that furnaces be large enough to serve their purpose without being forced, since forcing is wasteful of fuel and overheats the room air-supply. The latter is not only bad in itself, but increases the danger of contamination by the gases of combustion. Some means of mixing cold air with hot is desirable, in order to prevent the shutting off of the fresh-air supply when the room becomes too warm.

STEAM AND HOT-WATER HEATING. Either steam or hot water is the most common medium for heating the better class of residences and large buildings and groups of buildings. Either may be conveyed long distances with ease, and both are practically unaffected by the direction or the strength of the wind, freedom from a limitation which is one of the greatest drawbacks to the use of hot-air furnaces. Another advantage of steam and hot water is that they may be produced in connection with a steam plant for power purposes, but this is of less account

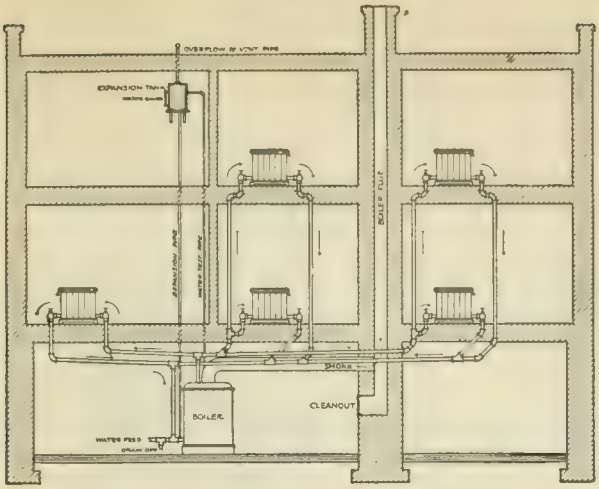


FIG. 3. HOT-WATER HEATING—USUAL METHOD OF PIPING.

now than before electric power became so common. The great disadvantage of either steam or hot water, when employed in direct radiation systems, is that they merely warm the air already in the room, instead of bringing in a constant supply of fresh warm air. This matters little where an independent system of ventilation has been provided and is intelligently used; but in small buildings, particularly houses, there rarely is a system of ventilation. It is to meet this objection that either the indirect system or the direct-indirect is often employed in place of direct radiation. Both steam and hot-water systems require a boiler or heater, a pipe system, and radiators. As the hot water is circulated at 140° F., against 212° F. for low-pressure steam, the radiating surface for hot water must be larger than for steam. Hot-water fitting requires greater care in design and construction than steam, which, coupled with the fact that steam-fitting has been practiced extensively for many years, has rendered the adoption of hot water less common than steam. Of late, however, hot water has been coming to the front. It has this great advantage over steam, namely, that it begins to yield heat very soon after the fire is started and continues to do so until the water cools, while there can be no heat from steam plants until a water temperature of 212° F. has been attained, and none after it falls below that point. On the other hand, steam heat may be shut off more quickly than water, since the latter continues to give off its heat for a much longer period.

Steam boilers and hot-water heaters alike require a furnace, with a grate surface for burning the fuel and a heating surface for imparting the heat thus derived to the water in the boiler or heater. Where steam for both power and heat is to be generated, the boiler will be chosen principally for its suitability for power; or wholly so if the exhaust steam from the engine is to be used for heating. Where the boiler is employed for heating only, low-pressure steam is likely to be used, and the boiler need not differ very much from a water heater, except that the former has a reservoir for steam mounted above the heating surface, while the latter has not. Low-pressure steam systems, it may be explained, show some 5 to 10 pounds pressure at the boiler, and lower through the pipes and radiators. The choice of a boiler, from the many types and styles available, will depend upon a variety of local and even individual conditions. Thus a vertical boiler may be chosen where horizontal space is scarce and vertical space is ample; or a water-tube boiler may be selected where a high pressure is to be carried for power purposes. Where fuel is cheap or the service is likely to

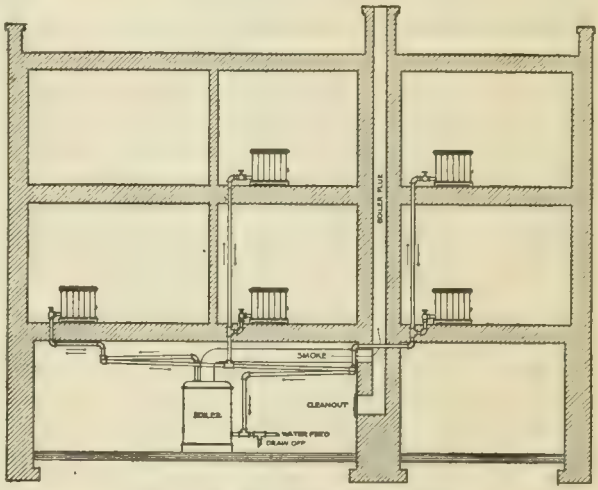


FIG. 5. STEAM-HEATING—PARTIAL-CIRCUIT SYSTEM.

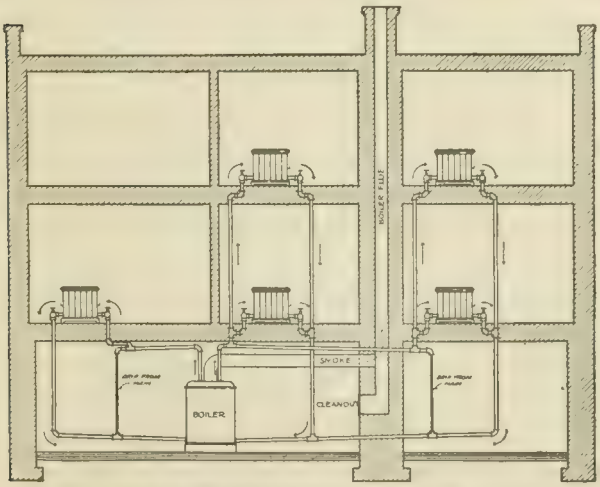


FIG. 4. STEAM-HEATING—TWO-PIPE SYSTEM.

be temporary, a boiler of low efficiency may be permissible, to save a relatively large capital outlay. The character of labor readily available as boiler attendants may have a very important bearing upon the choice of a boiler. Thus for heating most residences and many school buildings simplicity, coupled with a maximum of safety, even under neglect, may be of more importance than economy of fuel. Sectional boilers are advantageous here, since a small portion, instead of the whole boiler, may give way in case of accident. Under other conditions fuel economy may be put first, with the understanding that the continuous service of a skilled fireman will be insisted on. In large heating plants, particularly central heating stations (see following page), automatic stokers may be used to feed coal to the furnaces and also mechanical means for removing the ashes. See BOILER.

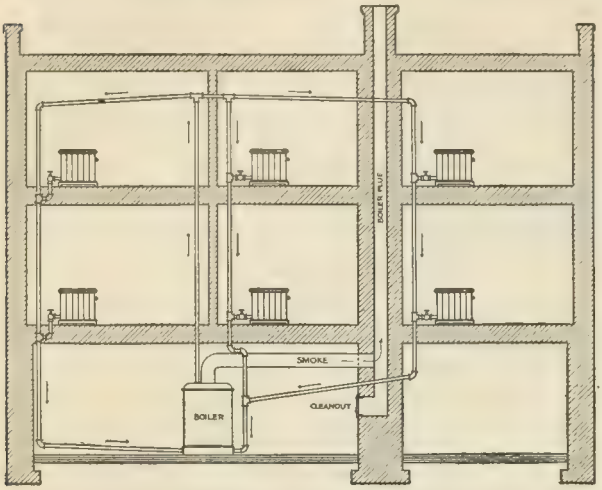


FIG. 6. STEAM-HEATING—DIRECT-CIRCUIT SYSTEM.

PIPING AND RADIATORS. Pipes for distributing both steam and hot water and for returning the condensed steam and the partially cooled water to the boiler and heater, respectively, are generally of wrought iron, with screw joints formed by means of couplings. The pipe-lines and radiators are controlled by various steam, water, and air valves, some of which are automatic. In most isolated plants the circulation is maintained wholly by gravity. Originally the radiating surfaces were mostly of cast-iron pipe, in horizontal lines, but this was superseded by coils of wrought-iron pipe, and these, in turn, have been largely replaced by vertical radiators, of either cast or wrought iron. For direct heating, cast-iron radiators are most commonly used.

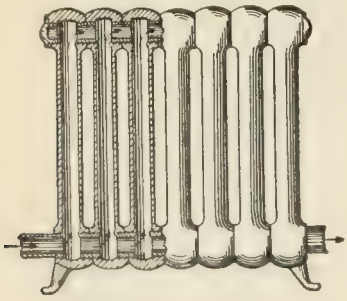


FIG. 7. SECTIONAL RADIATOR FOR HOT-WATER HEATING.

For steam, the connections enter and leave the vertical radiators at the base, but hot-water radiators have connections at the top, as well as at the bottom. This allows the air, which collects at the highest point in all water-pipes, to be drawn off. The indirect radiators are of either cast or wrought iron, placed in a chamber, so the fresh-air supply to be warmed may be passed over or through them. Some of the essentials of radiator designs are ample radiating surface, free passages to minimize friction, and good drainage in the case of steam radiators. To prevent the escape of heat where not needed for warming, steam and hot-water pipes are covered with asbestos, felt, or other insulating materials. Where high-pressure steam is used for heating it is generally reduced before entering the distributing system, since steam at much over 212° F. would be unpleasant if not dangerous to those coming near or in contact with the radiators. Recent improvements in heating include the securing of a partial vacuum in the pipes and radiators before admitting the steam, thus lessening the trouble with air. It may also be mentioned that fans are employed to aid the circulation of air in the indirect systems of steam and hot-water heating.

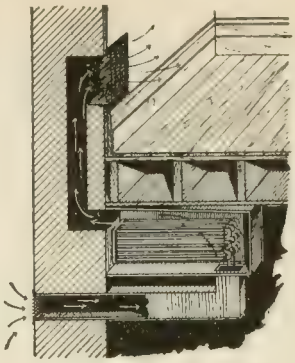


FIG. 8. RADIATOR FOR INDIRECT SYSTEM.

ELECTRIC HEATING. Heat is developed by the passage of an electric current through any conductor; the greater the resistance of the conductor the higher will be the temperature to which it is raised by the passage of the current. This is the principle upon which all electric heaters are constructed. These heaters have come into considerable use since 1895 for heating street cars. Their general construction is as follows: Wire of high resistance is imbedded in asbestos, fire-clay, or other refractory material and built up into plates of large radiating surface, these being generally inclosed between iron plates. The current is passed through the resistance wire, which at once becomes very hot and in turn heats up the refractory material and the inclosing iron. When the heater has been brought up to the required temperature the current may be turned all or partly off, and, owing to the nature of materials used, the heater will retain its heat for a long time. To heat water

or other liquids the resistance coils or the cases which contain them may be placed in the liquid to be heated. Electric heating is used but slightly, except in electric street-railway cars, where current is more readily available than any other means of heating. The heaters are placed beneath the seats, running throughout the length of the car; thus a good distribution of the heat is possible, making a pleasant contrast with the heat derived from the small red-hot coal-stove formerly used. In special cases, where economy is of relatively small importance in comparison with, say, advertising effects or convenience, electric heating is used for apartments in buildings. In a few restaurants and clubs it is also used for cooking. Its cost is so much greater than the more direct utilization of fuel that the general use of electric heating is a luxury in which even the very rich do not indulge. This may be the better appreciated when it is remembered that there is a loss at every step in the process of developing heat by electricity, and that the steps are many. Thus, there is a loss in the combustion of fuel, in the transformation of the heat so obtained into steam, in the utilization of steam in the engine, in the conversion of the power thus obtained to electric energy, in the transmission of that energy through wires to the electric heater, and finally in the reconversion of the electric energy to heat.

One of the great advantages of the electric current for cooking is that though there is great loss of power in the course of transmission, there is little loss of heat at the point where it is applied, while only a small proportion of the fuel burned in ordinary cook-stoves is utilized for cooking. See ELECTRIC HEATER.

HEATING WITH ARTIFICIAL GAS is far less expensive than electric heating, but with illuminating gas at $1 per 1000 feet it costs some four to ten times as much as heating with coal. Where cheap fuel gas is available the case for artificial gas heating is not so bad. Gas may be used in fireplaces, stoves, hot-air furnaces, and steam and hot-water systems. For occasional use in fireplaces or other heating apparatus placed in living-rooms gas is often advantageous. It makes no dust, and thus possesses a great advantage over coal or wood. But without good ventilation it vitiates the atmosphere; or at least it consumes much of the available oxygen and may give off objectionable gases. Gas for cooking is rapidly growing in favor, particularly for summer use.

THE CHOICE AND DESIGN OF HEATING PLANTS. The factors entering into both the choice and design of heating plants are many and various, including range of temperature through which the air is to be raised, the size and character of the building to be heated, the sort of fuel to be used, the heating system to be employed, and the amount of ventilation, if any, to be provided.

As to temperature, the usual basis for all American calculations is the attainment of 70° Fahr., the original temperature varying with the locality and season, sometimes falling to —20° Fahr., or even lower. In the matter of the individual buildings there must be considered the area of the ground plan, the number of stories, the number and cubical contents of the several rooms, the areas of exposed or outer wall and window surfaces, and the material of which the outer walls are built, whether of wood, brick, or stone. A large ground plan, for instance, precludes heating with hot air, unless a fan or blower is used, or many furnaces are employed. The character and area of the outer walls of the buildings have an important bearing upon the amount of heat lost by passage through them. The choice of fuel depends largely upon local prices, but there are other important considerations, such as the smoke nuisance from soft coal, which may be (but often is not) avoided with large plants, but cannot be avoided in most plants for heating private residences. In the design of a specific heating plant the relation of grate to heating surface of the hot-air furnace, steam boiler, or hot-water heater must first be considered, having in mind the fuel and the type of furnace or boiler to be employed. Next comes the relation of the heating surface to the radiating surface, when steam or hot water is used, and finally the proportion of the radiating surface to the cubical space to be warmed. Any skimping on the various proportions named means either insufficient warmth in very cold weather, or overworking the heating apparatus, a practice which is wasteful of fuel, may injure the heating plant, and, worst of all, be a menace to health. The foregoing factors in the choice or design of heating apparatus are by no means the only ones, but are sufficient to show the technical nature of many of the problems involved, and the desirability of intrusting the solution of the latter to persons of skill and experience. In fact, the possible savings in fuel and doctor's bills are so great, to say nothing of matters of comfort and convenience, that a thoroughly competent engineer or architect may well be consulted in the selection, or design, and installation of heating plants for all buildings, from moderate-sized residences up. For all but very small heating plants, and for all systems of ventilation, this will be essential to the securing of the best possible result.

CENTRAL HEATING PLANTS are employed to heat a number of buildings from a common source. Steam or hot water is conveyed from the central station to the several buildings through underground pipes. Within the buildings the heat is distributed in the same manner as when generated on the premises. Hot water must be returned to the central station, but the condensed steam is drawn out of the system in each building and discharged into the sewer. By first passing the exhaust through an economizer indirect heating and ventilation may be afforded. The central station equipment consists of boilers for steam and heaters for hot water, or else utilizes the exhaust steam from electric light and power stations, as explained below. The large size and greater efficiency of the central station, as compared with isolated plants for private heating, results in economy in construction and operation, in addition to which there are the savings due to the use of cheaper fuel and automatic devices for feeding the coal to and removing the ashes from the furnaces. The consumer reduces his fire risk, avoids the dirt and dust incident to isolated heating, the bother of getting coal into and ashes out of his cellar, and all possible vitiation of the air of his house by furnace gases. The community at large may be benefited by a marked reduction in both the ashes and the smoke nuisance, the latter being of great possible importance where soft coal is used for domestic fuel. Finally, the consumer may be assured of an

equable temperature, night and day. As an offset to the economy of central heating there is the cost of installing and maintaining the distribution system, and of making good the losses of heat in transmission. Then it must be remembered that the care of isolated heating plants involves, oftentimes, no extra expense for labor, since they are tended by some member of the family, or some employee whose time is not fully occupied. Few central heating plants, except for colleges and other institutions having groups of buildings, were constructed until there came into vogue the utilization, for this purpose, of the exhaust steam from electric lighting and power plants. The occasional early installations were most frequent where a number of large customers could be secured near the station, particularly if steam could also be sold for power purposes. The latter was quite possible, since live steam was supplied to the mains, and reduced in pressure at the premises to be heated. From 1895 to 1900 many heating installations were added to central electric lighting plants. Although still largely an experiment, at least in many details, this departure seems sure to extend rapidly. The combination adds stability to both the electric and the heating industry: (1) By enabling the former to utilize a large percentage of the heat value of the fuel, which would otherwise go to waste; (2) by saving the entire fuel bill of the latter, so long as the exhaust steam is sufficient for the heating demand; (3) by making it easier to secure customers for both current (light and power) and heat, since many possible consumers either went without electric light and power, or maintained isolated plants, because they required a steam plant for heating purposes. On the other hand, where the exhaust steam is used for heating, non-condensing engines, with lower efficiency than condensing, are generally employed. At present the majority of electric stations use non-condensing engines, so they are at liberty to choose between the more efficient condensing engine as a means of utilizing a portion of their exhaust steam and central heating installation to utilize the whole of it. The basis for choice rests upon a variety of local circumstances, including the cost of fuel, and the number and character of the population near the electric station.

Station Equipment for central plants is much the same as for isolated ones, only on a larger scale. When combined with electric plants, live steam must be made available when the demand for heat is greater than can be supplied by the exhaust steam. In such cases the pressure of the live steam is reduced before admitting it to the mains. Back pressure on the engine must be eliminated as far as possible. This may be effected, at times of low demand for exhaust steam, by wasting a part of the exhaust. If hot water is the heating medium, the exhaust steam is passed through a heater, then condensed and the warmed water distributed by pumping.

Distribution Systems consist of supply pipes for the steam or hot water and return pipes for the latter, and corresponding branches, or services, for the several consumers, all of which must be carefully installed to prevent loss of heat in transmission. The pipe is generally of wrought iron. Special provision must be made for expansion and contraction. The expansion joints are known as *variators*. They are made without packing, both to save the trouble and expense of its renewal and to diminish the number of manholes. Insulation is secured in a variety of ways. One of the most effective and cheapest means of insulation is bored pine logs. The large pipe is inclosed in regular compartments, often formed of brick side walls and plank tops. The space between the walls and the pipe is packed with some non-conductor of heat, in addition to which the pipes may be wrapped with asbestos felt. More expansion joints, better insulation, and more thorough protection against ground water are required for steam than for hot-water pipes, on account of the higher temperature and consequent greater heat losses of steam, and also to prevent condensation. Inside the building line there is a shut-off valve, and beyond that there may be a reducing or a regulating valve, to maintain the pressure at the desired point, regardless of its amount or variation in the street pipes. Next in order comes the meter, where the steam is sold by direct measurement, or the condensed steam may be passed through a hot-water meter on the main waste pipe leading to the sewer.

A hot-water supply may be metered, provided its temperature is kept fairly constant at the station. In some plants, however, the temperature, rather than the volume, of the water is increased when more heat is required. Steam may be supplied to either steam or hot-water radiators, but the lower temperature of hot water renders a previous installation of steam radiators inadequate for hot-water service, besides which a change in the piping system may be required. The temperature in hot-water systems is sometimes regulated at the central station and sometimes it is left to the customer. In either case the regulation may be effected by a thermostat. In fact, thermostats may be employed to a greater or less extent on nearly all systems of heating, isolated as well as central. The charges for central heating are most frequently based on the service for a whole season, modified by either the radiating surface supplied or the cubical space which that surface is designed to heat. Seasons, of course, vary both in length and in range of temperature, and the amounts of heat desired by different consumers also vary. On these and other accounts it is a convenient basis, and it is more attractive to new consumers than any system of metering, with its indefinite promise as to the cost of service.

The introduction of central heating plants for general municipal service was largely due to Birdsill Holly, of Lockport, N. Y. The first trial of his idea was made at Lockport, about 1880, when he organized a company for that purpose. Soon after, a plant with five miles of mains was installed in New York City. These, and a number of other Holly plants, supply steam for power, as well as for heat. At present a large number of both steam and hot-water plants are in use. They are operating under a great variety of conditions and their location ranges from Atlanta, Ga., to Seattle, Wash. Some of the plants are serving customers in towns with only a few thousand inhabitants.

VENTILATION.

History of Ventilation. Although special openings were left in the roofs of Roman buildings for the escape of air, their object was to

regulate the temperature rather than the air-supply of the building. Later the necessity of securing a supply of fresh air in mines served to call attention to the necessity of ventilation independent of heating. In the sixteenth century Georg Agricola (q.v.) wrote a treatise, *De Re Metallica*, in which he describes the methods employed to ventilate the mines of Saxony and Bohemia.

In France ventilation was formerly studied chiefly from the standpoint of securing a fresh-air supply for hospitals. In 1843, according to Pecht, there was but one hospital in France having a regular ventilating apparatus. In 1853 two systems were tried in the construction of the Hospital Lariboisière, one of aspiration, the other of inflation. Both were unsatisfactory because neither of them supplied a sufficient quantity of fresh air. In Germany, as in France, the early history of ventilation is connected with hospital construction. In England attempts at securing a fresh-air supply began much earlier, and consisted in repeated attempts to secure ventilation for the English Houses of Parliament. In 1660 Sir Christopher Wren made the first attempt, and the history of the subsequent efforts made would be an epitome of the advance of the science of ventilation. In 1856 the General Board of Health of England appointed a commission to inquire into the best methods of warming and ventilating dwellings. About the same time, owing to the heavy losses by sickness in the Crimean War, the question of barracks-room ventilation was under discussion.

In the United States, as in England, the early attempts at ventilation were directed toward securing fresh air for the meeting-places of legislative assemblies, the first report on the subject having been made on April 2, 1849.

Ventilation has for its object the maintenance of a pure-air supply indoors. This can be effected only by the removal of foul air and the introduction of an equal amount of pure air. Unfortunately, the fact that these two processes go together is often overlooked. Considered from the standpoint of the air in the room, ventilation removes or dilutes such impurities as have been introduced by man, regulates the moisture, cools the air, and may be instrumental in warming it, although the latter, properly speaking, pertains to heating. Ventilation has no effect on the quality of the air introduced. Therefore, it alone can give no better air than that surrounding the building to be ventilated. It is sometimes practicable to remove dust from the fresh-air supply, in case dust cannot be avoided, by filtering the air through cotton cloth or fibre, or through fine meshes of wire. The moisture of the air-supply may be lessened by drying, and air which is too dry may be moistened by spraying with water. The chief impurities in the air of houses and public assembly rooms are those thrown off by the lungs and skin. Next in importance are the gaseous products of the combustion of oil and gas for lighting, and of these two substances and coal when used for heating. Dust, also, is found everywhere, some being due to the processes already mentioned, some being brought in on the feet and clothes, or blown in through doors and windows, while large quantities of it are due to the wear and tear of clothing, carpets, and the like. In shops and factories the air is contaminated in most of the ways already mentioned, some of which, like dust, may be intensified many fold. In addition, the air of manufactories is liable to be made impure by the gases given off by the chemicals employed or produced, or by the decomposition of organic matter. The number of hours in a day during which a room is occupied, as well as the number of occupants in proportion to the cubical contents of the room, has a most direct bearing upon the vitiation of the air and the means to be employed to rectify it. Thus, dwellings of the better class have some of their rooms continuously occupied for one-half the day, and still other rooms for the remaining half, the air-space to each person being large. Churches may be crowded, but generally only for one to two hours at a time. School buildings, legislative assemblies, and factories may be crowded for hours together, then as completely emptied as churches. Hospital wards are liable to be fully and continuously occupied, in addition to which there are various well-known special ways of contaminating the air of hospitals. Wherever rooms are used intermittently, it is generally possible to give them a thorough airing by throwing the windows wide open; but, beneficial as this may be, its effect is not permanent, and, with the best of intentions, it is quite sure to be neglected, particularly in cold weather. Even in the summer time the ventilation of crowded assembly halls and hospitals cannot be left with safety to the interchange of air due to open windows, since the air may be stagnant outdoors as well as in. In capacious dwelling-houses, with walls, doors, and windows not too tight, the natural interchange between the inner and outer air may suffice during a large part of cold weather, while open doors and windows will give as much fresh air in summer as it is practicable to provide; but there will be times in cool weather when even these favorable conditions will be lacking.

It is pretty clearly shown by the foregoing that ventilation should be made an essential feature in the design and use of practically all classes of buildings in which people live, work, are instructed, or amused. The quantity of air to be supplied and removed, and the proper means of doing both, can be best understood after considering in more detail the nature and amount of the chief impurities which it is desired to avoid. The vital principle of air is oxygen. Normal air contains about 20.9 per cent., in volume, of oxygen, 79 per cent. of nitrogen and argon, and 0.1 per cent. of other substances, including some 0.03 or 0.04 per cent. of carbonic acid (carbon dioxide). After having been passed through the lungs the oxygen has been diminished to 16 per cent., and carbonic acid has been increased to 4.4 per cent. of the total volume, the nitrogen rising slightly to some 79.5 per cent. This exhaled air is rapidly diffused throughout the room, so unless the room is crowded the percentage of total oxygen is not greatly diminished for some time. With the reduction in the oxygen comes a change in the gaseous pressure in the lungs, as well as a lowering of the amount of the vital principle of the air-supply, both of which cause serious disturbances when carried far. Associated with the diminished oxygen there is also an increase in watery vapor, in the effete and putrescible organic contents of the air, and possibly in the number of harmful bacteria

which it contains. Another cause of diminished oxygen is the burning of oil and gas for illumination. As an index of the impurities present, and of the diminution of oxygen, carbonic acid has been chosen. For convenience it is generally expressed in parts per 10,000, thus giving 4 parts per 10,000, instead of 0.04 per cent., as the normal average amount in the air. In the purest air the carbonic acid may fall to 2.2 parts; in cities it may be normal at 4.5 parts; in occupied rooms it may go to 33 parts per 10,000, or even higher. Without going into the calculation involved, or considering the other impurities, it may be said that when the air of a locality shows an excess of carbonic acid above the normal for the locality as great as 2 parts per 10,000 it is considered to be polluted; also that it has been found desirable to supply each person in a room with at least 30 cubic feet of fresh air per minute, or 1800 cubic feet per hour. Obviously, the actual amount of air required will vary with the character of the rooms and their occupants, two very important considerations being whether or not the occupants are engaged in physical exercise, and the number of hours of continuous occupancy. After a careful consideration of the subject, including a weighing of authorities, Dr. John S. Billings, in his work on ventilation, gives the following table:

	Cubic feet of air per hour
Hospitals	3,600 per bed
Legislative assembly halls	3,600 per seat
Barracks, bedrooms, and workshops	3,000 per person
Schools and churches	2,400 per person
Theatres and ordinary halls of audience	2,000 per seat
Office rooms	1,800 per person
Water-closets and bathrooms	2,400 each
Dining-rooms	1,800 per person

These figures are for use in planning new buildings, where no allowance is placed "on leakage through crevices or on bad construction of the building as a source of air-supply," and where it is "assumed that the walls will be rendered more or less impermeable by paper and paint." In the case of old buildings, where for any reason it is difficult to supply so much air as recommended above, Dr. Billings says one-half the amount may be made to do, but it will be unsatisfactory. He also emphasizes the fact that the whole ventilating and heating system must be proportioned in accordance with the figures given, or any modification of them which may be adopted, including all air-ducts, inlets and outlets, blowers, and heat-generating apparatus.

Ventilation may be divided into two classes, gravity and mechanical. *Gravity ventilation* is based on the fact that warm air is lighter than cold, and hence is overbalanced and replaced by the latter. In cold weather the inner is warmer than the outer air, so, if sufficiently capacious inlets and outlets are provided, the warm, foul air will be displaced by cool, fresh air. But in warmer weather the differences in temperature, and consequently in pressure, are less and the interchange lags. The currents in the ventilating ducts may then be aided by a slight heating, which may be effected in a variety of ways, such as a light fire, or even a gas jet or jets in the base of the ventilating shaft; or a coil of steam or hot-water pipes, where feasible. Even if there be no ventilating flues, there will be a more or less constant interchange of air through the walls and the cracks around chimneys and doors; but in well-constructed houses this may be very small in fairly cold weather, and practically nothing in mild weather, while for schools, churches, and the like it is of little consequence except on very cold or windy days. This interchange may well be called *natural ventilation*, a term which may also be extended to include all ventilation depending solely on the difference between the inner and outer air. It may be added that natural ventilation has been used quite extensively in contradistinction to *forced ventilation*, and in place of the term gravity ventilation employed in this article; but when gravity ventilation is assisted by fires at the base of the stocks it, also, seems to belong properly under forced ventilation. The more recent nomenclature adopts gravity in place of natural, and mechanical in place of forced ventilation. *Mechanical ventilation*, as the name implies, depends upon machinery for the movement of the air. It may be used to introduce fresh air, to remove foul air, or both. Where indirect heating is employed the warm-air and the fresh-air supplies may be identical, but in mild weather the combined supply does not move readily by gravity alone, so mechanical aid may be advantageous. With direct heating an independent air-supply is required, and in cold weather it, also, must be heated. When not heated, such a supply may need to be urged along by mechanical power. With either indirect or direct heating an air-blast has the great advantage of perfect control of the fresh-air supply. If a hot-air blast is employed, both heating and ventilation are under equally good control, and it is claimed that the heating is more economically done. For the removal of foul air mechanical means are also advantageous, as being more reliable than gravity. The most common mechanical aids employed are blowers or fans, placed in the air-ducts, and either forcing the air ahead of them or creating a vacuum into which it rushes. Screw propellers and pumps may also be used to force the air. The terms *plenum*, or inflating, and *vacuum*, or aspirating, are applied, respectively, to blowing in and to sucking out air. The great danger in either system is that the fans, blowers, or other air-movers will be too small, in which case the friction losses will render them expensive to operate, and the air current will be so rapid as to cause draughts, or else an insufficient amount of air will be moved. There is also danger that a desire to economize in first cost will lead to air-ducts deficient in size, with the same general results. The proper elevations for introducing fresh and removing foul air are still mooted questions. It is certain, however, that the relation of the inlets and outlets should be so placed as to give the most perfect diffusion of the fresh air and to leave no stagnant foul air in the rooms, which will also tend to avoid heavy draughts. Many authorities favor the location of the inlets and outlets on the same side of a room, the inlets to be above the heads of the occupants. The theory is that the fresh air will ascend to and pass along the ceiling, and that the foul air will pass along the lower part of the room and then out. One of the chief objections to locating inlets, for either heating or ventilation, in the floor is that the ascending air carries up floor-dust with it; and another is that unless the

inlets are very numerous the inrush of air will be unpleasant to those near by.

BIBLIOGRAPHY. Consult Billings, *Ventilation and Heating* (New York, 1893), which is particularly full in its discussion of ventilation, and includes descriptions of the ventilation of a number of hospitals and other public buildings; Carpenter, *Heating and Ventilating Buildings* (New York, 1895), which goes more fully into heating and develops the mechanical phases of both subjects; Baldwin, *Hot Water Heating and Fitting* (New York, 1890); Richards and Woodman, *Air, Water, and Food* (New York, 1900), which sets forth the physiological side of ventilation briefly and clearly, and has a valuable chapter on methods of air analysis, and the determination of carbonic acid; Putnam, *The Open Fireplace in All Ages* (Boston, 1881); Dwyer, on "Stoves and Heating Apparatus," in *One Hundred Years of American Commerce* (New York, 1895); *Proceedings American Society of Heating and Ventilating Engineers* (New York, 1894-1900).

HEA'TON, AUGUSTUS GEORGE (1844—). An American painter, born in Philadelphia, Pa. He was the first United States student admitted to the Ecole des Beaux-Arts in Paris (1863). He studied under Cabanel there, and afterwards became a pupil of Bonnat, and exhibited several times at the Salon. Among his works are: "Washington at Fort Duquesne;" "The Recall of Columbus," which was bought by the United States Government and engraved for the 50-cent stamp of 1893; "Hardships of Emigration," engraved on the 10-cent stamp, celebrating the Trans-Mississippi and International Fair; and "The Promoters of the New Congressional Library" (1888). He also painted portraits of Mrs. Jefferson Davis and Amélie Rives.

HEATON, MARY MARGARET (1836-83). An English art critic, the daughter of a silk-printer, James Keymer, who was a friend of Douglas Jerrold. She wrote: *Masterpieces of Flemish Art* (1869); *Life of Albrecht Dürer* (1870); and a valuable *Concise History of Painting* (1873; and in Bohn's *Artist's Library*, 1888); as well as contributions to Bryan's *Dictionary of Painters and Engravers*.

HEAT-STROKE, SUNSTROKE, or THERMIC FEVER, also called INSOLATION, HEAT APOPLEXY, SUN FEVER, and SIRIASIS. The effect produced upon the body by exposure to intense heat, whether from the sun, from furnaces, or from the atmosphere. Another form of affection resulting from exposure to heat is HEAT EXHAUSTION, or HEAT PROSTRATION, in which there is a very different set of symptoms. In the commoner, mild form of heat prostration, the patient exhibits exhaustion, weakness, faintness, and occasionally nausea; in the severe form, pallor, great depression, collapse, and loss of consciousness, with a subnormal temperature dropping sometimes as low as 95° F. All cases recover in a few hours. Heat-stroke, on the contrary, usually comes on abruptly, or is preceded by some weakness and anxiety. Unconsciousness supervenes early, with flushing of the whole body and profuse sweating, delirium or even mania, vomiting and diarrhœa, and a temperature of 108° to 115° F. Death may ensue speedily, from cessation of respiration or from cerebral anæmia; the sweating ceasing, the full rapid pulse becoming imperceptible, and asphyxia, coma, or convulsions following. Laborers in the open, laundresses in an overheated kitchen, bakers, and firemen in engine-rooms, present most of the cases. Many cases occur at night among those exposed to indoor heat who have not been in the sun at all; others who have been in the sun during the day are stricken at night in the vitiated atmosphere of crowded tenement-house rooms, after drinking alcoholic beverages and eating hearty meals.

Two and six-tenths per cent. of the heat produced by the chemical metabolism within the body is lost from the body in warming substances taken in as food and drink, 2.6 per cent. in warming the inspired air, 14.7 by evaporation, and 80.1 per cent. by radiation and conduction from the skin. With the inspired air hotter than the body, radiation and conduction abolished, and evaporation rendered impossible in an atmosphere nearly saturated with vapor, the constant production of heat by muscular action must result in a great strain upon the inhibitory cerebral centres that preside over heat regulation. Any previous ill health, alcoholic indulgences, or other excess is followed by a failure of these centres under such strain, and heat-stroke is the result. The combined influence of heat and auto-intoxication constitute the combined cause of heat-stroke, with the possibility of a germ poison. Sambon, of Rome, in a paper on heat-stroke published in 1898, asserted the infectious character of the disease as produced by a specific germ. He classes it with yellow fever, dengué, and other tropical affections, all germ diseases requiring high atmospheric temperature for their development. This view has yet to be substantiated. Van Gieson, of New York, however, during an extensive examination of brains of victims of heat-stroke, found changes in the chromophilic plaques of the ganglion-cells. These plaques were changed in shape, fewer in number, replaced by fine dust, or entirely absent. The nucleus of the brain-cell stained very deeply, and within the nucleus membrane were found minute spherical granules not normally present. Van Gieson says: "There seems to be no other interpretation open as to the significance of this degeneration than the operation of a toxic substance upon the ganglion-cells. . . . There is in insolation a toxic cytolysis or cell resolution of the neurons." He considers the morphologic changes in the ganglion-cells similar to those produced by alcohol, lead, and the microbe poisons; and that heat-stroke is "a species of auto-intoxication, the neural symptoms finding a clear and definite explanation in the acute parenchymatous degeneration induced by an autogenous poison."

The treatment of heat prostration, the mild form of thermic exhaustion, consists in securing elevation of the temperature of the body by the use of external heat and in supporting the heart by the use of alcoholic stimulants, strychnine, and similar drugs. In heat-stroke, on the other hand, rapid reduction of temperature must be secured at the earliest possible moment. Sprinkling ice-water over chest and body or rubbing with ice is imperative. It has been urged that ambulances carry ice and a sprinkler, that treatment may begin as soon as the patient is reached, and continued during his trip to the hospital. Here the patient is placed on a Kibbé cot or a Walton bed, and the cold affusion is continued till the temperature falls to 102.5° F. He is then rubbed dry, removed to a bed and wrapped

in warm blankets, with as little disturbance as possible during the operation. If the temperature rises, the ice-water treatment is to be repeated. Acetanilid and antipyrine have been used with success as antipyretics, adjuvant to the ice-water. Venesection has been practiced with great relief in some cases. Ether or chloroform has been used to control convulsions, anæsthesia being continued for several hours. Morphine is very valuable in many cases. Flagellation of the extremities, sinapisms to the legs, stimulating rectal injections, atropine, digitalis, and nitroglycerin all have been used, in addition to the drugs mentioned.

The sequelæ of heat-stroke possible are headache, tinnitis, deafness, insomnia, impaired memory, insanity, epilepsy, paralysis, meningitis, and many functional irregularities, especially of the heart. Heat-stroke is often preventable. Laborers should dress in thin, loose clothing in place of woolen; sleeping-rooms should be ventilated, stimulants should be avoided, shelter from the sun should be provided when possible, and plenty of water should be drunk by those exposed to the heat. Troops, as well as gangs of laborers, should be inspected, and when sweating ceases and the skin becomes hot and dry, relief from duty, rest, and a cold bath should be ordered.

Consult: Wood, *Thermic Fever or Sun-Stroke* (Philadelphia, 1872); Townsend, "Sun-Stroke at the New York Hospital," in *Medical Record* (New York, 1880); Horton, *Diseases of Tropical Climates: Sun-Stroke* (London, 1879); Borely, *Le Coup de chaleur* (Paris, 1884); Ellis, "Treatment of Insolation," in *Medical Record* (New York, 1888-89); Ellis, "Insolation: Immediate Treatment Necessary," in *New York Medical Journal* (New York, 1891); Stowell, "Sun-Stroke at the Massachusetts General Hospital," in *Boston Medical and Surgical Journal* (Boston, 1892); Lambert, "Sun-Stroke," in *Medical Record* (New York, 1897).

HEAU'TON TIM'ORU'MENOS (Lat., from Gk. ἑαυτὸν τιμορούμενος, *heauton timoroumenos*, the self-tormentor). A comedy by Terence, based on a play with the same title by Menander, and first performed in B.C. 163 at the Ludi Megalenses. In it Terence developed the intrigue of the original into an extravagant plot. The play is lacking in life and in delineation of character. It contains the famous line, "Homo sum; humani nihil a me alienum puto."

HEAVEN (AS. *heofon*, OS. *heban*, Icel. *hifinn*; connected with Goth. *himins*, Icel. *himenn*, OS. *himil*, OHG. *himel*, Ger. *Himmel*, heaven, ceiling). In theology, that portion of infinite space in which the Lord of all things, although present throughout all, is supposed to give more immediate manifestations of His glory. Of the belief in the existence of some such special scene of the presence of the Deity, most of the known religions of the world, ancient and modern, present abundant evidence. Aristotle declares that all men, whether Greeks or barbarians, have a conception of gods; and all agree in placing the habitation of the gods in the most elevated region of the universe. Plato is equally explicit. Even Epicurus teaches the same doctrine; and one of the treatises deciphered from the papyri of Herculaneum is a treatise by him, in which the position and the other characteristics of the habitation of the gods are minutely discussed. The same may be said of the Persian, the Egyptian, the German, the Scandinavian, and in general, of all the ancient religions in which the belief of the existence of a supreme being assumes any other form than the pantheistic; and even in the pantheistic religions, although the philosophers may have adhered to the strict pantheistic view, and may have denied that any special locality could be regarded as the peculiar seat of the Deity, yet we find the popular belief and the popular worship even of such religions plainly founded upon the contrary supposition. In addition, however, to the idea of its being the special scene of God's glory, the word heaven also designates the place, or the state or condition, of the blessed spirits, and of the souls of just men who are admitted into the participation or the contemplation of the divine beatitude. In the religious system of the Greeks and Romans, none were supposed to be admitted to the heaven of the gods except the deified heroes or demigods; but with them the elysian fields (q.v.) of the lower world held, morally speaking, the same place in relation to the great doctrine of the divine retribution for the good and evil actions of human life. The elysium of the classic mythology is in all essential respects the natural equivalent of the heaven of the just. The Pythagorean doctrine of metempsychosis approached nearer to it in form; for it supposed that the soul, after the purification of successive transmigrations, was elevated to a higher and incorporeal condition in the cosmos. The doctrine of Plato was still more explicit. It may be said in general that all the philosophical systems which included the belief of the immortality of the soul, also involved, at least in substance, the idea of a state of happiness as the reward of a virtuous life. The happiness, however, of the heaven of these various creeds differed widely from the spiritual delights of the heaven of Christianity, each nation and each class forming to itself its own ideal of enjoyment. The delights of the classical elysium were, at all events in part, delights of sense. The German warrior had his war-horse and his armor laid in his grave, that he might be able to pursue, after death, the fierce enjoyments in which he had delighted while in the world of the living. The paradise of the Indian hunter is but a richer and more extensive hunting-ground. The paradise of the Mohammedans is grossly sensual. Still, not only these, but even the more groveling conceptions of other races, must be regarded as a natural manifestation of the same instinct. *The Testament of the Twelve Patriarchs* (see APOCRYPHA) contains a very curious exposition of the same notion.

The Hebrews conceived of the sky as a solid firmament, upholding the celestial reservoirs of water. (See FIRMAMENT.) They invariably used a plural noun for heaven indicating a belief in a plurality of heavens, Gen. i. 1; Deut. x. 14; I. Kings viii. 27; Ps. cxlviii. 4. It is probable that the conception of seven heavens, based on a division of the celestial spaces among the seven planets, existed already in early times in Israel. In the beginning of the Christian Era this idea finds expression in the Slavonic Enoch (q.v.), and some parts of the Testaments of the Twelve Patriarchs, where the character of each of the seven heavens is described in detail. It is noticeable that in Enoch vii. the sinning angels are

imprisoned in the second heaven, and that in chapter x. the sinners among men are punished in the northern part of the third heaven. Substantially the same conception is found in the Ascension of Isaiah, the Apocalypses of Moses, Ezra, John, Isaac, Jacob, and the Acts of Callistratus. In view of these facts, it becomes probable that in the Pauline Epistles the heavens are also assumed to be seven in number. Thus paradise is in the third heaven in II. Cor. xii. 2, 3, as in Slavonic Enoch viii.; in Eph. vi. 12 there are spiritual hosts of wickedness in the heavens; in Col. i. 20 the kings in heaven as well as on earth have to be reconciled to God; in Heb. iv. 14 the great high priest passes through the heavens. The Jewish apocalyptic sketch in Rev. xii. describes a war in heaven, between Michael and his angels and Satan and his angels. While ultimately the old Semitic doctrine of seven heavens and of battles and places of punishment in one of these heavens was suppressed in Christian thought, it continued in the religious systems of the Mandæans (q.v.) and in the Koran. As the storm-cloud was the celestial abode of Yahweh, Israel's god, so the translation of such heroes as Enoch and Elijah originally implied only that they were carried alive from earth to be with Him among the clouds. But as the conception of the Deity expanded, His heavenly dwelling-place began to occupy more fully the imagination. In the Ethiopic Enoch (see ENOCH, BOOK OF) and the Slavonic Enoch this antediluvian patriarch describes minutely the heavens through which he is permitted to pass. The hope awakened through the Persian doctrine of resurrection, of a release from sheol, in the case of all Israelites or of the pious in the nation, offered the possibility either of a new life on earth or of a translation to heaven. In the recorded sayings of Jesus there is no description of heaven. His answer to the question of the Sadducees touching the resurrection seems, however, to imply that He considered those who had been accounted worthy of being raised from the dead as living in heaven, being like angels, neither marrying nor being given in marriage (Luke xx. 33 sqq.). The dominant view in the early Church seems to have been that until the return of the Lord upon the clouds of heaven to raise the dead, those who had died were asleep, and that they would be suddenly awakened to be given their new bodies, after which they would reign with Him on earth for a thousand years before their final translation to heaven. But, largely under the influence of Greek thought, other conceptions prevailed. The fate of the patriarchs, prophets, and pious men of the old dispensation naturally occupied much attention and led to the idea that they were detained in a preparatory abode which the fathers called *limbus patrum*, awaiting the advent of the Redeemer. The general belief of Christians has been that since the resurrection of Christ the just who are free from sin are admitted immediately after death into heaven, where their chief joy consists in the unclouded vision of God. But especially since the sixteenth century there have been many who have returned to the millennial views of a part of the early Church. (See MILLENNIUM.) While Christians generally have maintained that since the coming of Christ no human being can be admitted into heaven without some identification with Him or His Church, through personal faith, or the sacraments, it has been held by some that access to Heaven would not be denied to unbaptized infants, pagans, or others having had insufficient opportunities of embracing the gospel, while others have believed that all souls would ultimately reach heaven. Consult: Smend, *Alttestamentliche Religionsgeschichte* (Freiburg, 1899); Holtzmann, *Neutestamentliche Theologie* (Freiburg, 1897); Morfill and Charles, *Book of the Secrets of Enoch* (Oxford, 1896); Atzberger, *Christliche Eschatologie* (Freiburg, 1890); Charles, *Eschatology* (London, 1899). See ESCHATOLOGY; IMMORTALITY.

HEAVES (from AS. *hebban*, Goth. *hafjan*, OHG. *heffan*, Ger. *heben*, to lift), or BROKEN WIND. A disease or unsoundness of the respiratory organs of the horse, which, from the French *pousse*, was termed by some of the old English writers on farriery *pursiness*. The nature of the malady is not well understood, though difficult expiration by a spasmodic or extraordinary effort is characteristic. The air is inspired with ease.

A broken-winded horse does not generally thrive, is lean, and has a dependent belly, the muscles of which are usually active as expiratory muscles. The characteristic symptoms are best observed when the horse is exercised. The breathing becomes very labored, the nostrils dilated, the eyes bloodshot, and even blue, an indication of imperfect blood purification. On watching the chest and flank, the ribs are observed very actively moved, and after collapsing, when the air is expelled from the lungs, are further depressed by a spasmodic jerk brought about by the abdominal muscles. A broken-winded horse has the hollow cough referred to by veterinarians as characteristic of unsoundness. When the animal is oppressed by fast work, or by dragging a load up a hill, the pulse is excessively rapid, a symptom regarded by some as indicating disease of the heart, and by others an affected diaphragm. In reality it is a dietetic disease, and is due to the irritation in the stomach caused by indigestible food, being reflected from the nerves of the stomach to those of the lungs. On post-mortem examination the stomach is found to be much distended with food of a dry nature, and to have thinner walls than is normal. The lungs are lighter in color, and float much more buoyantly than in health; little or no blood is seen in them, but they contain a large quantity of air, which makes them crackle when pressed.

The treatment of heaves is very unsatisfactory, and a palliation of the symptoms by keeping the alimentary canal in proper order, administering occasional purgatives, and feeding on a proper quantity of the best oats, which should always be bruised, are all that can be recommended as remedies; but turning out to pasture, or feeding on cornstalks or other laxative food, sometimes produces a cure in mild cases. Only the best quality of hay should be fed, and that in small quantities. Some veterinarians have vaunted their power to cure this disease, and recommend large doses of camphor, digitalis, and opium; but these potent narcotics only operate for a very short time, and as their effects pass off the symptoms return, often with increased severity. It is generally conceded that the disease is incurable. Horses very frequently drop down exhausted when at hard work, and die either from congestion of the lungs, hemorrhage, or simple suffocation.

HEAV'YSEGE, Charles (1816-76). A Canadian poet, born in Liverpool, England. For some time after his arrival in Canada (1853) he followed his trade, that of a cabinet-maker, but later branched off into wood carving, and then went into journalistic work for the Montreal *Witness*. After publishing anonymously *The Revolt of Tartarus* (1853), and a volume of sonnets, he produced his best work, a three-part tragedy entitled *Saul* (1857), followed by *Count Filippo, or the Unequal Marriage: A Drama in Five Acts* (1860); *The Dark Huntsman* and *The Owl* (1864); *Jephthah's Daughter* and a novel called *The Advocate*, in 1865.

HEB'BEL, Friedrich (1813-63). A German poet and dramatist of peasant birth and cosmopolitan education. He was born at Wesselburen. As a vestryman's clerk he printed poems in journals and found patrons who enabled him to study at Hamburg, Heidelberg and Munich. In 1841, having gone back to Hamburg, he published *Judith*, a tragedy. Then, going to Denmark, where he had closer acquaintance with Thorwaldsen and Oehlenschläger, he received a traveling scholarship from the King, visited Paris, stayed several years in Italy, and on his return (1846) married and settled in Vienna. Already he had written two noteworthy dramas, *Genoveva* (1843) and *Maria Magdalene* (1844). His best later works are *Julia* (1851), *Agnes Bernauer* (1855), and *Die Nibelungen* (1862), all of which show dramatic instinct, powerful character-drawing, and an intensity of passion that is sometimes extravagant and sometimes uncouth or gruesome. His smaller poems are most attractive. Hebbel's works include the dramas *Herodes und Mariamne* (1850); *Michel Angelo* (1855); and *Gyges und sein Ring* (1856). Hebbel more or less followed Grabbe, with whom he shares a liking for the uncouth, but Hebbel is more poetic and more conversant with theatrical requirements. He is also distinguished for love of psychological enigmas. His *Tagebücher* are in 2 vols. (1885-87). Consult: Kuh, *Biographie Friedrich Hebbels* (Vienna, 1877); Kulke, *Erinnerungen an Friedrich Hebbel* (ib., 1878); Bartels, *Friedrich Hebbel* (Leipzig, 1899). His works were edited by Krumm (12 vols., Leipzig, 1900) and by Werner (12 vols., Berlin, 1900).

HEB'BURN. A town in Durham County, England, on the south shore of the Tyne estuary, four miles east of Newcastle. It is an important industrial centre, with ship-building and supplementary establishments, engineering and chemical works. The public buildings include a mechanics' institute, an armory, and isolation hospital; among modern municipal improvements are a new drainage system, a public park, and electric lighting. Population, in 1891, 16,645; in 1901, 20,901.

HEBE, hē'bē (Lat., from Gk. Ἥβη). The goddess of youth, the daughter of Zeus and Hera, or, according to others, of Hera alone, the wife of Heracles after he had been deified. She was the cup-bearer of Olympus before Zeus conferred that office upon Ganymede (q.v.), and she always retained the power of restoring the aged to the bloom of youth and beauty. In the cult she usually appears joined with Hera or with Heracles; but in Phlius she was worshiped as Ganymede, and at Sicyon as Dia, as one who frees from all bonds, apparently through the joys of life. Statues of Hebe are rare, but on vases and reliefs she often appears with Heracles or as cup-bearer of Zeus. The representations of Hebe and the eagle are probably all modern. Consult: Kekulé, *Hebe* (Leipzig, 1867); Preller-Robert, *Griechische Mythologie* (Berlin, 1894). See Juventas.

HEBEL, hā'bel, Johann Peter (1760-1826). A German dialect poet. He was born at Basel, studied at Erlangen, and in 1791 became professor in the gymnasium at Karlsruhe. In 1805 he was appointed Church councilor, and in 1819 prelate. He is chiefly known for his *Allemannische Gedichte* (poems in a Swabian dialect, 1803; last ed. 1894), which, reviewed by Goethe in the *Jenaische Allgemeine Litteraturzeitung*, made him famous. He also wrote for his periodical, *Der Rheinländische Hausfreund*, a number of short stories afterwards published as *Schatzkästlein des Rheinländischen Hausfreundes* (1811). Consult: Schultheiss, *Hebels Leben* (Heidelberg, 1831); Längin, *Johann Peter Hebel, ein Lebensbild* (Karlsruhe, 1874); and Giehne, *Studien über Hebel* (Würzburg, 1894).

HE'BER, Reginald (1783-1826). An English poet, second Bishop of Calcutta, born at Malpas, Cheshire. In 1800 he entered Brasenose College, Oxford, and three years afterwards produced his prize poem, "Palestine," one of the very few prize poems that have lived. In 1805 he became a fellow of All Souls. In 1807 he was inducted into the family living at Hodnet. In 1812 he was made prebendary of Saint Asaph, and published a volume of poems; in 1815 he was appointed Bampton lecturer at Oxford, and in 1822 preacher at Lincoln's Inn. The next year he was consecrated Bishop of Calcutta. During his three years in India he labored with great zeal, traveling through his vast diocese, healing dissensions, and encouraging his fellow-missionaries. His prose writings include the Bampton lectures on *The Personality and Office of the Christian Comforter* (1816); *A Life of Jeremy Taylor* (written in 1822); *Sermons* (1829, 1830); and *Journey Through India* (1828). His fame, however, rests chiefly on his beautiful hymns, as "From Greenland's Icy Mountains," and "Holy, Holy, Holy! Lord God Almighty!" Most touching is the poem addressed to his wife: "If thou wert by my side, love." Consult: *Life*, by his widow (London, 1830), and by G. Smith (ib., 1895). The poems, collected in 1841, were reprinted in 1881.

HEBER, Richard (1773-1833). An English bibliophile, son of Reginald Heber, and half-brother of Bishop Reginald Heber, born at Westminster. He was educated by George Henry Glass, and at Brasenose College, Oxford. Closely following his early devotion to Latin poetry, especially to Persius, Claudian, and Silius Italicus, whom he labored to edit, came an interest in Early English drama and poetry; and he became the intimate friend of Walter Scott, who frequently alludes to him in his notes and dedicated to him the sixth canto of *Marmion*. He was chosen member for the University of Oxford in 1821, and resigned from Parliament five years afterwards. His wonderful collections of books were not mentioned in his will, and were sold at auctions in London, Ghent, and Paris; they in-

cluded more than 145,000 volumes, and formed a matchless library of Early English literature.

HEBERDEN, William (1710-1801). An English physician, born in London. He graduated at Saint John's College, Cambridge, in 1728; studied medicine in London, and practiced for ten years in Cambridge and for more than thirty years in London, where he was prominent in the College of Physicians. A remarkably original thinker, Heberden took minute notes on his more important cases, and published them under the title *Commentarii de Morborum Historia et Curatione* (1802), of which an English translation, possibly by his son William, appeared in 1803. His contributions to the *Medical Transactions* of the College of Physicians include a description of the first recorded case of angina pectoris, and other original matter.

HÉBERT, ā'bâr', Ernest (1817—). A French painter, born at Grenoble. He was a pupil of David d'Angers and Paul Delaroche, and won the Prix de Rome in 1839. He was director of the French Art School in Rome from 1866 to 1873 and from 1885 to 1890; was elected a member of the Institute in 1874, and was chosen commander of the Legion of Honor in 1874. Although classic and elegant in style, and an excellent colorist, Hébert has often a cloying sentimentality. His best-known pictures are: "A Slave who has Freed Himself;" "La malaria" (1850); and "Le baiser de Judas" (The Kiss of Judas) (1853), in the Luxembourg, and a number of portraits, among which are those of Roberty and a young woman (in the Luxembourg). He received first medals at the Salon of 1851 and the Paris Exposition of 1855, and the medal of honor at the Paris Exposition of 1889.

HÉBERT, Jacques René (1755-94). A journalist and politician of the French Revolution. He was born at Alençon, November 15, 1755, of respectable parents, and was educated at the local college; but disgracing his family by his wild conduct, he quitted Alençon, went to Rouen, and subsequently came to Paris. There he dragged out a miserable existence from 1780 to 1790. He finally emerged from obscurity in the latter year as a pamphleteer and editor of a rabid republican paper, *Le Journal du Soir*. He first became famous, however, as the editor of the journal *Le Père Duchesne*, started in opposition to a publication of the same name edited by Lemaire. Knowing the tastes of the class of people he addressed, he displayed such an exaggeration of principles and cynicism of language as not only ruined the enterprise of his honest rival, but caused Hébert to become a popular idol, and earned for him the name of 'Père Duchesne.' After the events of August 10, 1792, he became a member of the Revolutionary Commune, and as such approved of the September massacres. In December, 1792, he became a substitute procureur for the Commune, and in 1793 actively advocated the overthrow of the Girondist party. The Convention, alarmed at the violence of the Communists, ordered Hébert and three others to be arrested. His popularity was so great, however, that he had to be set at liberty a few days later, and he was presented with a civic crown by the Commune. With Chaumette he inaugurated the worship of Reason, and as a member of the commission appointed to examine Marie Antoinette, he added to her sufferings by accusing her falsely of scandalous offenses. His party were called *les enragés*, and advocated the most extreme measures; but the Committee of Public Safety, under the control of Robespierre and Saint-Just, caused the Hébertists to be arrested, March, 1794, and after a summary trial Hébert, together with many of his adherents, was guillotined, March 24, 1794. His wife perished on the scaffold a month later with Gabel and Chaumette. Consult: Duval, "Hébert chez lui, dans la révolution française," *Revue Historique*, vols. xii. and xiii. (Paris, 1880-81); Brunet, *Le Père Duchesne d'Hébert* (ib., 1859); Tridan, *Les Hébertistes* (ib., 1864); Mater, *J. R. Hébert avant la journée du 10 Avril, 1792* (Bourges, 1888); Aulard, *Le culte de la raison et le culte de l'être suprême* (Paris, 1892).

HÉBERT, Louis Philippe (1850—). A Canadian sculptor, born at Sainte Sophie d'Halifax, Quebec. He early manifested a taste for art, and studied several years in a studio before he went to Paris, where he afterwards settled. His works include several historical statues for public buildings in Ottawa, Montreal, and Quebec. He won the Confederation medal presented by the Canadian Government in 1894.

HÉBERT, Pierre Eugène Emile (1828—). A French sculptor, born in Paris. He was the son of a sculptor, who taught him the art. He had a bust in the Salon by the time he was twenty-one, reappeared there with a bronze group (1863), and exhibited at the international exhibitions of 1855 and 1867, and at Vienna in 1873, besides doing special work—"Bacchus" for the Tuileries (1866); a bronze statue of Rabelais for the city of Chinon; a stone statue of Regnard for the Hôtel de Ville, Paris; a marble bust of Cabet for the Museum of Dijon; "La comédie et la drame" for the Vaudeville; bas-reliefs and busts of Davau, Balzac, and others.

HÉBERT, Théodore Martin (1829—). A French sculptor, born in Paris. He was a pupil of Chevillon, and after 1848 exhibited such works as an equestrian statue of Napoleon; an African hunter fighting with an Arab on horseback; "Faust et Marguerite" (1861); "L'Innocence" (1864); "Renaud et Armide" (1866); besides busts, bas-reliefs, and groups in plaster and in marble. He received honorable mention in 1859.

HEBRA, hā'brâ, Ferdinand, Ritter von (1816-80). An Austrian dermatologist, born at Brünn. He was educated at the University of Vienna; in 1842 became instructor in the medical faculty; was appointed consulting physician of the general hospital of the city in 1848, and professor of dermatology in 1849. He was the first great German dermatologist, and entirely reformed the therapeutics of the science. He strongly indorsed local treatment. He wrote: *Atlas der Hautkrankheiten*, with Elsinger and Heitzmann (1856); *Lehrbuch der Hautkrankheiten*, with Kaposi (1872-76); and a third and smaller work under the former title, with Bärensprung (1867-68).—His son, Hans von Hebra (1847-1902), was a specialist in the same branch, and wrote: *Lehrbuch der Hautkrankheiten* (1884), and *Die krankhaften Veränderungen der Haut mit Beziehung auf die Krankheiten des Gesamtorganismus* (1884).

HEBREW LANGUAGE AND LITERATURE. See Jews; Semitic Languages.

HEBREW MELODIES. A collection of poems by Lord Byron which, with music by Braham and Nathan, was published in 1815 by Murray, who gave £500 for them. Among them are "The Destruction of Sennacherib," "Jephtha's Daughter," and "She Walks in Beauty."

HEBREW MUSIC. Our knowledge of ancient Hebrew music is perhaps more limited and unsatisfactory than what we know of any other civilized nation of antiquity. From the Egyptian frescoes and relics, from the Greek treatises and descriptions, and from the modern Chinese instruments and theoretical works, we gain a fairly complete idea of the music of those nations; but, with the exception of a few reliefs on coins, practically our sole source of knowledge about Hebrew music is the Bible, which must be supplemented by constant reference to the musical instruments of the Assyrians and Egyptians.

In view of the late redaction of those books (like Genesis) which relate to the earliest traditions, great care must be exercised in using the notices about the supposed antiquity of music among the Hebrews. Such a notice, e.g., as is found in Gen. iv. 21, where Jubal is said to be "the father of all those who handle the harp and organ" ('organ' being obviously a mistranslation), has of course no historical value; and similarly the description of Miriam dancing and singing after the deliverance of the Hebrews from Pharaoh and his army (Exod. xv. 20-21) is probably part of the later embellishment of the exodus of some of the Hebrew tribes from Egypt, although it is quite probable that something of the kind took place under the circumstances. On the other hand, an incidental reference to "songs, drum, and lyre," in connection with friendly leave-taking, such as is found in Gen. xxxi. 27, is of decided value as pointing to a popular custom associated with a comparatively primitive form of life. The instruments themselves must have been correspondingly primitive; and with this restriction clearly understood, there is no objection to the assumption that Hebrew tribes, even during the nomadic period, had some music, and, like the ancient Arabs, had their battle-songs, their songs of triumph, their songs celebrating the exploits of their favorite heroes, which they chanted or sang to the accompaniment of primitive forms of drums and of simple stringed instruments, while for the purpose of calling the people together for battle or assembly, some simple form of wind instrument perhaps existed in very early days. Through foreign influence—notably from Egypt and Babylonia, and later from Greece—the simple instruments gave way to more elaborate ones, and a large variety of percussion, wind, and string instruments was gradually introduced into Palestine. That the earliest use of music among the Hebrews was largely if not exclusively secular seems reasonably certain; but the religious bearings of events of a secular character, such as battle and victory songs, rejoicings at harvest-time and wedding festivities, lend to music even when thus employed also a certain religious significance. On all the occasions named, with the exception perhaps of wedding festivities, the tribal or national deity would come in for a share at least of recognition. His help was sought before proceeding to battle; to him thanks were offered for the victory, and it was his favor that had blessed the fields with plenty. From such considerations it did not require many steps for the introduction of music as part of the organized worship. To what extent, however, music was introduced in the pre-exilic temple at Jerusalem it is difficult to say. Certainly the elaborate description furnished by the chronicler (I. Chron. xv. 11-24; II. Chron. v. 12, etc.) of the temple service and organization in the days of David and Solomon applies to the second temple (and even here only in a measure), and not to the first. Similarly the melodies and musical directions connected with the Psalms belong to the later phases of post-exilic worship among the Jews, though all this does not preclude the possibility that in pre-exilic days music on occasions formed part of the temple service in Jerusalem, and perhaps also in connection with some of the sanctuaries outside Jerusalem.

Only a few of the musical instruments mentioned in the Old Testament are genuinely Hebraic in character. (1) Of stringed instruments the most common and probably the oldest was the lyre (Hebrew *kinnor*), the form of whose sounding-board, as also the number of its strings, varied considerably. Three to six strings appears to have been the ordinary number, but there are lyres depicted on Jewish coins with as many as twelve strings. Next to the lyre, the harp (Hebrew *nebel*) is most frequently referred to; but we must not suppose that the ordinary harp was a large affair, such as the Egyptians used. It was probably a small triangular instrument, consisting ordinarily of not more than ten strings. (2) The most common wind instrument among the Hebrews was the flute (Hebrew *khalil*), which, like the lyre, dates from very early times. It was the ordinary instrument at weddings and funerals, and in the second temple was played before the altar on festival occasions. It is probable that the Hebrews, like the Egyptians and the Assyrians, had both the long flute, held straight before the player, and the oblique flute, which was played by blowing into a hole at the side. The horn (Hebrew *shophar*) was a ram's horn, whose limited compass (never over an octave) made it unsuitable for other purposes than signals to assemble the people, to give the order to disperse, etc. In the Jewish ritual it was retained as a solemn rite, and to this day in orthodox synagogues the ram's horn is blown during the services on New Year's Day, at the close of the Day of Atonement, on the day of the Feast of Tabernacles, and during the entire month of Elul, after the recital of the supplications. The Hebrew trumpet (*khasoserah*), of which there is a representation on the Arch of Titus, was a very long instrument, and was used by the priests in the later temple service. (3) The chief percussion instruments were (a) the drum (*toph*), of which there were numerous forms, though ordinarily the hand drum is intended; (b) the cymbals (*mesiltayim*), which were made of metal; and (c) the sistrum (*menaanim*), which appears to have been introduced from Egypt. Besides the above list, there are quite a number of instruments mentioned in the Old Testament (cf. especially Dan. iii. 5-10), which have not yet been identified. For example, the *symphony* (Dan. iii. 5, margin) may have been a species of bagpipe, while the *shalishim* (I. Sam. xviii. 6) appears to have been a sort of triangle.

BIBLIOGRAPHY. Breslaur, *Sind originale Syna-*

gogen- und Volks-Melodien bei den Juden geschichtlich nachweisbar? (Leipzig, 1898); Saalschütz, *Geschichte und Würdigung der Musik bei den Hebräern* (Berlin, 1829), which gives a comparison of the Hebrew instruments with the Greek and the modern Arabian; Stainer, *The Music of the Bible* (New York and London, n. d.); Wellhausen's edition of the Psalms in the *Polychrome Bible* (New York, 1898), with appendix on the "Music of the Hebrews;" J. Weiss, *Die musikalischen Instrumente in den heiligen Schriften des alten Testaments* (Vienna, 1895); Bücheler, "Zur Geschichte der Tempelmusik und der Tempelsalmen," *Zeitschrift für Alttestamentliche Wissenschaft* (1899-1900); the Hebrew archæologies of Nowack and Benzinger; and for the musical instruments of the Book of Daniel, H. Derenbourg. See PSALMS; DAVID.

HEBREWS. The name given to a group of clans of Aramean stock, who trace their origin to Southern Babylonia. The ultimate home, however, of these groups, and of the Arameans and Arabs, is in general to be sought rather in the steppes of Arabia. Hence they passed to the north in two steady streams, one by a direct route into Palestine and Syria, the other by the Euphrates Valley, where some made more or less permanent settlements, attracted by the higher culture prevailing in that region, while others continued northward and passed into Syria and ultimately Palestine. The name Hebrew is first applied to Abraham (Gen. xiv. 13); but there is an earlier eponymous ancestor, Eber (Gen. x. 21), to whom it properly belongs. The designation of Abraham as 'the Hebrew' already reflects the later conditions when the Hebrew confederacy was organized. Where the name originated is, therefore, a problem for which no satisfactory solution has yet been proposed. Some have supposed that the name originally designated a nomadic people of invaders, and that the Habiri of the Amarna tablets are Hebrews in this sense. Inasmuch as the term is generally used by foreigners in designating the Hebrew confederacy (Gen. xl. 15; Ex. ii. 6; I. Sam. iv. 6), it has been interpreted as the name given to the people, and denoting those who had 'come from beyond.' The stem from which Hebrews is formed has this meaning; but the explanation is not acceptable, since in that case the name would hardly have acquired such importance as to give rise to an eponymous ancestor, Eber. The fact is that, since the literature of the Old Testament is for the great part written from a religious point of view, the distinctively religious designation of the confederacy as *Bene Israel* (or Israelites), or as Israel and Judah, receives the preference over *Ibrim* or Hebrews, and hence the latter is introduced only on special occasions and for some special reason. For the history, language, literature, and institutions of the Hebrews, see JEWS; SEMITIC LANGUAGES.

HEBREWS, EPISTLE TO THE (Gk. ἡ πρὸς Ἑβραίους ἐπιστολή, *hē pros Hebraious epistolē*, Lat. *epistola ad Hebræos*). An anonymous book of the New Testament. The questions concerning its author, the readers to whom it was addressed, and the place where, as well as the time when, it was written have all been points of critical debate, and it cannot be said that any one of them is yet positively settled.

I. The time of composition could not have been later than A.D. 95, since the book was used freely by Clement of Rome in his letter to the Corinthians, which is assigned to about this date. How much earlier than this it was written depends largely upon what is to be understood by the persecutions referred to in x. 32-34. If they are to be identified with the Claudian edict (see PERSECUTIONS OF THE CHRISTIANS), it cannot be dated earlier than 48; if they are to be identified with the Jewish War (see JEWS), it cannot be dated before 65. In fact, whichever event is intended, it is likely that the writing was long subsequent to it, since the persecutions are referred to as belonging to the 'former days' (x. 32). As between these two events, however, the statement in xii. 4 that the readers had 'not yet resisted unto blood' would seem to make it unlikely that they had passed through the horrors of the Jewish War. But the force of this argument is dependent largely on the assumption that the readers were resident in Jerusalem or some part of Palestine. If resident elsewhere, then a new viewpoint of the persecutions is possible, and the above limits may not be necessary. It would seem to be certain that the author belonged to a generation later than the Gospel times (ii. 3; cf. Luke i. 1-4), and that the readers were under rulers different from those who had founded and had originally been in charge of the Church (xiii. 7). It would further seem to be clear that the persecutions mentioned in x. 32-34 as belonging to the 'former days' are to be separated from those in the midst of which the readers were at the time of writing, and in which they had not yet come to the shedding of blood (xii. 4), though the crisis of their troubles was not far beyond them (x. 25; cf. xii. 25-29). Anything more definite than this, however, must depend upon the consideration of the remaining points.

II. The place of the Epistle's composition would seem largely to depend on the interpretation of xiii. 24*b*. If 'they of Italy' is to be understood as referring to those who had come from Italy, then the Epistle was written somewhere outside of that country; if it is to be understood as referring to those who belonged to Italy, then the place of writing was most naturally somewhere within that land. As to which of these two usages the author had in mind, it may, perhaps, be impossible definitely to say; although, from the grouped character of the salutations in the verse, it would seem that he was sending a greeting to all those who were associated with the readers—both officers and fellow Christians—from all those who were associated with himself. But this would seem to imply that these latter were the Christians generally of the land from which he was writing, since otherwise they must be merely Christian sojourners who were accidentally in the place where he was. In this case we should have a general greeting on the one side and a strangely partial greeting on the other—a greeting from a group of Christian travelers in a city, but none from the Christians of the city itself. There would, consequently, seem to be something in favor of the Epistle's having been written within the land of Italy. If so it was probably at some other place than Rome, since Timothy's release from prison and his expected arrival at the place where the author was (xiii. 23) would indicate a coming from Rome, as the most probable place of imprisonment, to some other place where the author was awaiting him.

III. The readers of the Epistle have generally been considered Jewish Christians—a conclusion which would appear to be clearly evidenced by the distinctively Hebrew character of the argument employed in the Epistle. Recently, however, critics have claimed a Gentile Christian readership, saying that a Hebrew argument might have been formulated for Christians who were not Jews. Theoretically this is true; but were it so in this particular case, the Epistle would become a purely academic essay, lacking all the significance which would otherwise come from its appeal to the Jewish race from the point of view of its peculiar institutions and its distinctive Scriptures. It amounts to nothing in support of such Gentile readership to contend that the Epistle contains no direct statement of the fact that the readers were in danger of an apostasy to Judaism, for the readers might not have come to the point of apostatizing and yet have been Jews. Jewish Christians as well as Gentile might have been simply weak in the faith and in need of exhortation to hold fast to their profession. In fact, if this weakness of faith and insecurity of profession was the condition of the readers, it is difficult to understand why such a Jewish background to the strengthening exhortation given them was selected, unless they were Jewish themselves. In view of this background, such passages as vi. 1, 2, and xiii. 4 are of no significance, since they are both specifically applicable to Jewish Christians, the latter especially, in view of Paul's arraignment of the race in Rom. ii. 17-29.

Admitting the probability, therefore, that the readers were Jewish, their habitation would seem to be most naturally in a place of Jewish surroundings such as Palestine and Jerusalem. Against this, however, is the strong Alexandrian mode of thought which quite plainly underlies the Epistle's argument. This would not be natural in the places mentioned above. On the contrary, it would suggest Alexandria itself and Egypt. Against this latter location the only argument would be our general ignorance of the condition of early Christianity in this region. Rome is urged by modern critics, and, as far as the Alexandrian mode of thought is concerned, there might not be much against the place. As a matter of fact, however, the critics base their contention largely on the specifically Jewish character of the Roman Church—an argument which is so clearly against the facts of the Roman Epistle as to be impossible of acceptance. There would, consequently, seem to remain only some such locality as the Phrygian region of Western Asia—a region largely inhabited by Jews and largely under the influence of Alexandrian thought. With such a locality Timothy's relationship (xiii. 23, 'our brother Timothy'), and the evident tendencies of the readers to angel-worship (chs. i. and ii.), an eclectic spirit and a false asceticism (ch. xiii.) would be significant.

In view, therefore, of the probable Jewish character of the readers and their most natural location in Western Asia Minor, the strong probability of an Italian place of composition is greatly strengthened; since to Jewish readers resident in Phrygia a salutation from mere Italian sojourners would have no meaning. And in view of all three points, a date some time after the Jewish War would seem most reasonable; for then the Jewish colonies in the Diaspora would be largely increased and such independent Hebrew congregations more possible. We could also thus understand by the persecutions of the 'former days' the Jewish War, whose horrors were not likely to have faded from the exiles' minds; while the newer persecutions, in the beginnings of which the readers were (xii. 4), could quite easily be the rise of the Domitian anti-Christian aggressiveness. This supposition is favored by two considerations—the distinctive Jewish rivalry to Christianity after the destruction of Jerusalem, and the general Christian disappointment at the non-return of Christ, which had been widely expected in connection with this catastrophe, in view of the common understanding of the words of Christ as promising it. These two facts would almost seem to account for the troublous situation of the readers, at least from its Jewish side; for it is clear they were suffering from oppression by their unbelieving countrymen—an oppression which gathered an irritating strength largely from the failure of the expected return of their Christ. This oppression might be more or less connected with the Government's hostility, and shows the situation to have been one of peculiar danger, because of the combination of evil which threatened them. We might place the writing of the Epistle, therefore, somewhere about A.D. 90.

IV. The question of author has been generally held to be the most important point connected with the criticism of the Epistle. It is, in fact, the least important, since the even approximate settling of the above questions gives us practically all the critical knowledge of the Epistle which we need for working purposes. The fact, therefore, that there is no certain answer to this question is of no significance. At the same time it can be safely said that, whoever the author may have been, he was not Paul. This is universally accepted by critics to-day. Outside of Paul, evidence would seem, in some respects, to point to Barnabas, whose name was apparently attached to the manuscripts of the Epistle with which Tertullian was acquainted, and was considered by him in his day as an accepted tradition. Any definite conclusion, however, is impossible. The attempt of Harnack to credit it to Prisca and Aquila, chiefly Prisca, is not supported by the facts.

BIBLIOGRAPHY. *Commentaries:* Delitzsch (Leipzig, 1857); Kurtz (Mitau, 1869); Ewald (Göttingen, 1870); Westcott (2d ed., London, 1892); Davidson, in *Handbooks for Bible Classes* (Edinburgh, 1882); Kübel, in Strack-Zöckler, *Kommentar* (2d ed., Munich, 1895); B. Weiss, in Meyer, *Kommentar* (6th ed., Göttingen, 1897); Von Soden in *Hand-Kommentar zum Neuen Testament* (3d ed., Freiburg, 1901). *Introductions:* Holtzmann (3d ed., Freiburg, 1892); Salmon (7th ed., London, 1894); Jülicher (4th ed., Tübingen, 1901); B. Weiss (English translation, New York, 1888); Zahn (2d ed., Leipzig, 1900); Bacon (New York, 1900); Moffatt, *Historical New Testament* (New York, 1900). *Discussions:* Bleek, *Der Brief an die Hebräer erläutert* (Berlin, 1828-40); Wieseler, *Untersuchungen über den Hebräerbrief* (Kiel, 1861); Riehm, *Lehrbegriff des Hebräerbriefes* (Basel, 1867); Ayles, *Destination, Date, and Authorship of the Epistle to the Hebrews* (London, 1899); Bruce, *The Epistle to*

the Hebrews (Edinburgh, 1899); Harnack, *Chronologie* (Leipzig, 1897).

HEBREWS, Gospel of. See Apocrypha, section *New Testament*.

HEBRIDES, hĕb'rĭ-dēz. The name applied to all the islands of the western coast of Scotland, popularly known as the Western Isles (Map: Scotland, A 2). They are classified as the Outer and Inner Hebrides. To the Outer belong Lewis-with-Harris, North Uist, Benbecula, South Uist, Barra, and the remote Isle of Saint Kilda. The principal of the Inner islands are Skye, Coll, Tiree, Eigg, Mull, Iona, Staffa, Ulva, Lismore, Kerrera, Easdale, Colonsay, Jura, and Islay. Bute, Arran, and the Cumbraes, though lying in the Firth of Clyde, are usually classed with the Hebrides.

The total number of the Hebrides is about 521; of these not more than 120 are inhabited. The entire area is estimated at upward of 3000 square miles, and the population, in 1901, was 95,739. Only about 200,000 acres are arable; the rest is in pasture land, and in morasses, peat-mosses, lakes, and barren sands and rock. Geologically the Hebrides are divided into groups, of which the more important are the gneiss, trap, and slate. The scenery is grand and picturesque; Mull is noted for its lofty mountains, Jura for its peaks, and Arran for its high, rugged hills. Islay and Bute are comparatively level and arable. Staffa is remarkable for its basaltic columns and great cavern. Iona derives interest from its ruins and historical associations. Politically all the Hebridean isles are attached to Scotland. The counties among which they are distributed are those of Ross, Inverness, Argyll, and Bute. The principal Hebridean towns are Stornoway in Lewis, Portree in Skye, Tobermory in Mull, and Rothesay in Bute. Though situated on the mainland of Argyll, Oban (q.v.) is usually considered a town of the Hebrides, and, along with Rothesay, is best known to tourists. Sheep, cattle, and pony rearing, herring fisheries, and the manufacture of kelp are the chief industries. Live stock, fish, kelp, wool, and stone are the principal exports; iron and groceries the imports.

Enjoying the benefit of the moist southwest winds, the climate, although humid, is mild, pleasant, and healthful, and is recommended for certain classes of invalids. The poorer class of natives for the most part speak Gaelic. The establishment of several distinct lines of steamer communication with Glasgow, and the opening up of remote tracts formerly reached with difficulty, have developed the resources of the islands and brought them, with the neighboring coast, within the sphere of trade and the reach of tourists. Under modern proprietorship real estate has improved, and large tracts of moorland are annually rented to sportsmen as shooting-grounds.

The Hebrides are the *Ebudæ* of Ptolemy, the *Hebudes* of Pliny, and the *Sudreyjar* of the Norwegians. The Hebrides were first colonized in the ninth century by emigrants from Norway. They settled in the greatest numbers on the Shetland and Orkney Islands and Outer Hebrides, but soon wandered as far south as the Isle of Man, colonizing as they went. This resulted in the absorption of the Celtic into the Norse element in the northern islands, while southward the Celtic element remained predominant. The colony extended to the north and west coasts of Scotland, Cumberland, and Westmoreland, and probably founded the Norse kingdoms of Dublin, Waterford, and Limerick; it also sent a colony to Iceland in 874. The settlers became sufficiently powerful to annoy the mother country, whereupon Harald Haarfagr (King of Norway, c.866-933) fitted out a great expedition and subdued the Hebrides and Man. They remained subject to Norway till 1266, three years after the battle of Largs, and were then transferred to Scotland. In 1346 one of the chiefs, named Macdonald, reduced the whole under his authority, and took the title of 'Lord of the Isles;' but in 1540 they were finally annexed to the Scottish Crown by James V. The Hebrides were ecclesiastically dependent on Norway as late as 1374. Scott's *Lord of the Isles* contributed materially to create popular interest in these islands, which has been added to by William Black's novels. Consult: Buchanan, *Hebrid Isles* (London, 1883); Gordon-Cumming, *In the Hebrides* (ib., 1883).

HE'BRON (Heb. *Khebrōn*). A very ancient sacred city of Southern Palestine, the modern El-Khalil, about 21 miles south-southwest of Jerusalem. Hebron figures in tradition as one of the oldest cities of Palestine (cf. Num. xiii. 22), and was originally called Kirjath Arba, 'four-city' (Gen. xxiii. 2; Joshua xiv. 15; cf. Josephus, *Bel. Jud.*, iv. 9, 7). As one of the famous sanctuaries of the south, it became associated in the traditions and legends of the Hebrews with the beginnings of their history. All three patriarchs, Abraham, Isaac, and Jacob, are represented as sojourning in Hebron (Gen. xiii. 18; xxxv. 27; xxxvii. 14), and tradition locates here the cave of Machpelah, where all three, as well as Sarah and Rebecca, were buried (Gen. xxiii.; xxv. 9; xxxv. 27-29; xlix. 29-32; l. 13). The spies sent out by Moses before entering the promised land came hither (Num. xiii. 21, 22). Joshua is said to have destroyed the city, given it to Caleb for an inheritance, and made it a city of refuge (Joshua x. 36-37; xiv. 13; xx. 7). Hebron figures prominently in the history of David (q.v.); it was here that he was anointed King, first over Judah, later over all Israel (II. Sam. ii. 1-4; v. 1-3). The popularity of the Davidic dynasty probably had much to do with the production of legends regarding Hebron and the reshaping of old traditions of the place to make them conform to the later scheme of Hebrew historiography. It was from Hebron that Absalom made his attempt to secure the throne (II. Sam. xv. 7 sqq.). After this time it is seldom mentioned in biblical history. Judas Maccabæus captured it from the Edomites, and the Romans stormed it. It was held for a time by the Crusaders, but fell into the hands of Saladin (1187), and since then has belonged to the Mohammedans, who have always respected its sanctity and regard it as one of the four sacred cities of the world, Mecca, Medina, and Jerusalem being the other three. Its association with Abraham, who is called by the Mohammedans *Khalil Allah*, 'friend of God,' has given it its modern name. The modern city has a population of about 18,000 Mohammedans and 1500 Jews. The alleged sepulchres of the patriarchs are still shown, and an ancient oak at the neighboring Mamre is pointed out as the oak of Abraham. In the neighborhood are the so-called tombs of Ruth, Jesse, and Abner.

HEBRON. A city and the county-seat of Thayer County, Neb., 65 miles southwest of Lincoln; on the Little Blue River, and on the Burlington and Missouri River and the Chicago, Rock Island and Pacific railroads (Map: Nebraska, G 3). It is the commercial centre for a farming and stock-raising district. Population, in 1890, 1502; in 1900, 1511.

HEBRUS, hē'brŭs. The ancient name of the river Maritza (q.v.).

HEC'ATÆ'US (Lat., from Gk. Ἑκαταῖος, *Hekataios*). The most important of the Greek logographers (q.v.), son of Hegesander of Miletus. He flourished about B.C. 500. At the time of the Ionian revolt (c.501-493 B.C.) he strove in vain to keep his countrymen from entering upon the war with Persia, and after their defeat he went as an ambassador to Artaphernes, the Persian satrap, and induced him to treat the Ionians kindly. Like most of the logographers, he was an extensive traveler; to judge from the fragments of his work, he must have visited Greece, Thrace, the countries bordering on the Euxine, a great part of Persia, Africa, and possibly Italy and Spain. He wrote a work called *Genealogies* (Γενεαλογίαι), which was little more than a prose version of the poetical legends of the Greeks. His *Tour of the World* (Περίοδος Γῆς), in two books, is interesting from the fact that it was accompanied by a map, probably based upon that of Anaximander (q.v.). The fragments of these two works are published by Müller, *Fragmenta Historicorum Græcorum*, i. and iv. (Paris, 1841-70). Consult, also: Atenstädt, *De Hecatæi Milesii Fragmentis quæ ad Hispaniam et Galliam Pertinent*, *Leipziger Studien*, xiv. (1891); Tropea, *Ecateo da Mileto ed i frammenti della periegesis* (*estratto degli Atti dell' Acad. Peloritana*, 1896-97).

HECATE, hĕk'ȧ-tē (Lat., from Gk. Ἑκάτη, *Hekatē*, the far-working goddess, from ἑκάς, *hekas*, afar). An ancient moon goddess, as is clear, not only from her functions, but from the direct statements of the ancients. She is first mentioned by Hesiod, as the only daughter of the Titan Perses, and of Asteria, or night. The poet praises her as a mighty goddess ruling earth, heaven, and sea, the helper of hunters and fishermen, giver of victory in battle and council. Like other moon goddesses, she appears as helper of women in their confinement, guardian of children, and a goddess of marriage; she also possesses the power of purifying from sin, like Apollo. Mysteries were celebrated in her honor at Ægina, and in conjunction with the Corybantes in the Zerynthian cave of Samothrace. The special seats of her worship are found in Asia Minor and on the east coast of Greece, though in later times she was widely honored. Hecate in the general belief of antiquity was associated with the guardianship of doors and roads, and her sanctuaries seem in general to have been little more than wayside shrines. A statue of the triple Hecate by Alcamenes stood near the entrance to the Acropolis of Athens, and she was worshiped in private houses. The crossroads were under her special protection, and at them sacrifices, especially of dogs, were offered. At each new moon, also, the rich set out in her honor food, which was eaten by the poor. As a goddess of the night Hecate is also associated with the lower world, a companion of Persephone, and guardian of her door. She had control of the spirits of the dead, goblins, and spectres, her coming was greeted by the howling of dogs, and she was invoked by magicians and witches. From these varied functions, it is not strange that she became closely connected with Persephone, and especially with Artemis. In art she was at first represented as a maiden carrying torches, and this type persisted through the classical period. The common type, however, derived probably from her epithet Τριοδῖτις (Lat. *Trivia*, 'where three roads meet'), was that of three bodies, joined so as to face in three directions. In the frieze of the great altar at Pergamum, Hecate is shown as having three heads and six arms, but a single body, and this type appears occasionally in later works. Consult: Preller-Robert, *Griechische Mythologie* (Berlin, 1894), and especially Roscher, "Hekate," in *Lexikon der griechischen und römischen Mythologie* (Leipzig, 1886-90).

HEC'ATOMB (Lat. *hecatombe*, from Gk. ἑκατόμβη, *hekatombē*, from ἑκατόν, *hekaton*, hundred + βοῦς, *bous*, ox). Strictly, a sacrifice of 100 oxen, but even in the Homeric poems a term for any sacrifice of a large number of animals; thus we hear of a hecatomb of 12 oxen or of 50 rams. The belief that the favor of the gods was dependent upon the size of the offering probably was one factor in inducing such large numbers of victims; but a powerful influence was also exerted by the desire to feed the populace, since only a small part of each victim was actually consumed upon the altar. See also SACRIFICE.

HECK, BARBARA (1734-1804). One of the founders of the Methodist Church in America. She was born, of German parentage, in Ballygarry County, Limerick, Ireland, a district which early felt the influence of Wesley's preaching. She and her husband, Paul, came to America in 1760, and in 1766, with Philip Embury, organized a Methodist society in New York City. The building of the famous old John Street Methodist Church was due, in great part, to her tireless energy. During the Revolution the Hecks retired to northern New York, and finally to Canada, to be among Loyalists. They founded the earliest Methodist society in Canada.

HECK'ER, FRIEDRICH KARL FRANZ (1811-81). A German revolutionist and American soldier. He was born at Eichtersheim, in Baden, September 28, 1811, and after studying law in Heidelberg became, in 1838, advocate of the Supreme Court in Mannheim. Elected, in 1842, a member of the second Chamber in Baden, he abandoned his profession for political life, and soon grew popular among the more advanced elements of the opposition. He sat and voted with the Extreme Left, and his influence helped to oust the Blittersdorf Ministry from office. In 1845, in conjunction with Itzstein, he conducted a democratic campaign in Germany, during which he was arrested at Berlin and expelled from Prussia. In 1848 he employed his eloquence in revolutionary agitation, and he and Struve became leaders of the advanced Revolutionary party. When the preliminary convention of the German nation (*Das Vorparlament*) met at Frankfort, Hecker endeavored, with the influence of his whole party, to constitute it into a permanent republican assembly. The frustration of this effort led him to attempt to surprise the smaller governments

of Southern Germany with the bands of artisans which had come from France. Defeated at Kandern, in Baden, April 20, 1848, he fled into the Canton of Basel, where he conducted a radical newspaper, and wrote his work, *Die Volkserhebung in Baden*. On being refused admission to the National Assembly at Frankfort, though twice elected to represent Thiengen, he emigrated to America, where he bought a farm at Belleville, Ill. The Baden Revolution (1849) brought him back to Europe; but finding the revolution over on his arrival, he returned to America. He was a colonel and brigadier-general in the Union Army during the Civil War. During his later years Hecker watched with interest the founding of the new German Empire, and was a stanch supporter of German interests in America. He died at Saint Louis, March 24, 1881. His *Reden und Vorlesungen* were published in Germany in 1872, and were followed two years later by *Betrachtungen über den Kirchenstreit in Deutschland und die Infallibilität*.

HECKER, Isaac Thomas (1819-88). An American priest of the Roman Catholic Church, founder of the Paulist Fathers. He was born in New York City, and early in life engaged in business. In 1843 he was a member of the socialistic community at Brook Farm, and later of that at Fruitlands, Mass. He also lived for some time with Henry D. Thoreau at the latter's 'Hermitage.' In 1844 he was converted to the Roman Catholic faith, and five years later was ordained to the priesthood by Cardinal Wiseman. He joined the Redemptorists, but with others was released from his vows, and in 1858 founded the Congregation of Saint Paul the Apostle, or Paulists (q.v.), in New York. Father Hecker was the founder and director of the Catholic Publication Society, and also founded and edited from 1865 until his death the *Catholic World*, the chief popular Roman Catholic magazine in America. His writings also included: *Questions of the Soul* (1855); *Aspirations of Nature* (1857); and *Catholicity in the United States* (1879). Consult Elliott, *Life of Father Hecker* (New York, 1891). The appearance of an abridged and incorrect anonymous French version (1897; 6th ed. 1898) of Father Elliott's volume evoked an attack by Abbé Maignan, of the Congregation of Saint Vincent de Paul, in *Le Père Hecker, est-il un Saint?* (1898). This was succeeded by the so-called 'American' controversy, for the settlement of which Pope Leo XIII. in 1899 addressed an apostolical letter to Cardinal Gibbons. For an account of the matter, consult Sedgwick, *Father Hecker* (Boston, 1900).

HECKER, Johann Julius (1707-68). A German educator, born at Werden, Prussia. At the command of Frederick II. of Prussia, he drew up a system of regulations for the government of common schools, parts of which are still in force. Consult Fr. Ranke, *Johann Julius Hecker* (Berlin, 1861).

HECKER, Justus Friedrich Karl (1795-1850). A German physician and writer of medical history, born in Erfurt, Prussian Saxony. He was professor of medicine in the University of Berlin, and wrote: *Geschichte der Heilkunde* (1822-29); *Der schwarze Tod im 14. Jahrhundert* (1832); *Die Tanzwut, eine Volkskrankheit im Mittelalter* (1832), translated into English by B. G. Babington, under the title, "The Dancing Mania of the Middle Ages" (1875); *Der englische Schweiss. Ein ärztlicher Beitrag zur Geschichte des 15. und 16. Jahrhunderts* (1834); *Geschichte der neuern Heilkunde* (1839); *Kinderfahrten, eine historisch-pathologische Skizze* (1845).

HECK'EWEL'DER, John Gottlieb Ernestus (1743-1823). An American pioneer missionary and orator, born in Bedford, England. He settled in Pennsylvania in 1754, studied theology, and entered the Moravian ministry. In 1771 he became assistant to David Zeisberger (q.v.), who had charge of the missionary work of that Church among the Indians in the Ohio country, whither Heckewelder proceeded in that same year. In this service he remained for fifteen years. In 1792 and 1793 he assisted in drawing up treaties between the United States and the Indians, by whom he was greatly loved and trusted. He remained in Ohio until 1810, when he settled at Bethlehem, Pa., and engaged in writing the history of his labors and observations. He published: *An Account of the History, Manners, and Customs of the Indian Nations Who Once Inhabited Pennsylvania and the Neighboring States* (1818), a work of great value which was translated into both German and French; *Narrative of the Mission of the United Brethren Among the Delaware and Mohegan Indians* (1820); *Names Which the Lenni Lenape or Delaware Indians Give to Rivers, Streams, and Localities* (1822). Consult Rondthaler, *Life of Heckewelder* (Philadelphia, 1847).

HECKLE, HATCHEL, HETCHEL. A wooden frame studded with iron teeth used for separating the shine or boon of flax and hemp from the fibre; also the operation of cleaning the fibre with this tool.

HECKMONDWIKE, hĕk'mond-wīk'. A manufacturing town in the West Riding of Yorkshire, England, 10 miles southwest of Leeds (Map: England, E 3). It has coal-mines, ironworks, machine-shops, and is an important centre of carpet, blanket, and heavy woolen manufactures. The town has improved in recent years; has good drainage, an ample water-supply, and electric lighting. Population, in 1891, 9700; in 1901, 9460.

HECKSCHER, hĕk'shēr, Johann Gustav Wilhelm Moritz (1797-1865). A German politician, born in Hamburg. He served during the War of 1815 as a volunteer in the Hanseatic Corps, and then studied at the universities of Göttingen and Heidelberg. Upon completing his studies he settled in Hamburg, where he practiced law, and, after 1840, directed the politics of the *Hamburger Nachrichten*. In 1848 he was elected to the Vorparlament, in which he opposed the propositions of the Democratic Party. In the National Assembly at Frankfort (1848-49) he was at first a member of the Left Centre, but inclined more and more to identify himself with the Right. He advocated the election of Archduke John of Austria as Vicar of the Provisional Government, in which he himself was appointed Minister of Justice, and opposed the proposition to exclude Austria and erect a German empire with a Prussian King as hereditary Emperor. Later he helped to organize the Pan-German Party.

HEC'LA, or **HEK'LA.** A volcano in Iceland, situated in the southwestern part of the island,

about 20 miles from the coast. It has an irregular cone built of lava, scoriæ, and ashes, and bare of vegetation, which rises to a height of 5100 feet above the sea. There are several subsidiary craters, besides the principal crater on the summit, and the cone is dissected by deep ravines, through which torrents rush down from the snow-fields above. The volcano has an extremely wild and desolate appearance. Eruptions take place at irregular intervals, the total number on record since the discovery of Iceland being 28. The most violent outbursts occurred in 1157, 1300, 1597, 1636, and 1766. In the last-named year a large area was buried beneath the ejected lava and ashes. The volcano was again active from September, 1845, to April, 1846, and in March, 1878. See ICELAND.

HECTARE, or **HEKTARE**, **HECTOGRAM**, **HECTOLITER**, **HECTOMETER**. See METRIC SYSTEM.

HECTIC FEVER (from Gk. *ἑκτικός*, *hektikos*, consumptive, from *ἕξις*, *hexis*, condition, from *ἔχειν*, *echein*, to have). A type of fever, usually associated with tubercular disease, abscess, or septicæmia, distinguished by an afternoon or evening rise of temperature, during which the patient has bright eyes, flushed cheeks, and some nervous excitement, while afterwards the temperature falls and profuse perspiration occurs. The treatment must be directed toward the existing disease, of which it is generally a grave symptom.

HEC'TOR (Lat., from Gk. *Ἕκτωρ*). The leader and mightiest warrior in the Trojan army, son of Priam and Hecuba, husband of Andromache, and father of Astyanax or Scamandrius. In the *Iliad* he appears as brave in battle, but hasty, and often imprudent; he is also full of reverence for the gods, tender love for his family, and devoted patriotism. During the absence of Achilles from the fight he storms the Greek camp and penetrates even to the ships. Driven back by Patroclus, the friend of Achilles, he at length slays him, by the help of Apollo. Roused by his thirst for vengeance, Achilles is reconciled with Agamemnon, and in divine armor routs the Trojans with fearful slaughter, and finally, after chasing Hector three times round the walls of Troy, slays him by the help of Athena, and drags the body at his chariot-wheels to the Greek ships. Here the corpse is miraculously preserved by the gods, and finally ransomed by Priam. With the mourning and burial of Hector the *Iliad* closes. In the post-Homeric literature little is added to the picture of Hector. At Ilium he was worshiped as a hero, and similar offerings were made at Thebes, whither it was said an oracle had commanded the removal of his bones. In art the combats of Hector with various Greek heroes, his death, the maltreatment of his body, and his ransom, are favorite subjects.

HECTOR, ANNIE (FRENCH) (1825-1902). A British novelist, best known by her pseudonym of 'Mrs. Alexander,' born in Dublin, Ireland. She began writing at an early age, but with so little success that on her marriage she laid aside her pen and resumed it only when the death of her husband obliged her to seek some means of maintenance. Among her novels, some of which met with considerable success, are: *The Wooing O't* (1873); *Her Dearest Foe* (1876); *By Woman's Wit* (2 vols., 1886); *Mona's Choice* (1887); *A Life Interest* (3 vols., 1888); *A Winning Hazard* (1896); and *Barbara: Lady's Maid and Peeress* (1897).

HECTOR, or **ECTOR**, SIR. The name of two knights in Arthurian legend.

HEC'UBA (Lat., from Gk. *Ἑκάβη*, *Hekabē*). The second wife of Priam, King of Troy, to whom she was said to have borne nineteen children, including Hector, Paris, Helenus, Cassandra, Deïphobus, Polydorus, and Troïlus. In the *Iliad* Hecuba appears as bringing offerings to Athena, trying to restrain Hector from the battle, and lamenting his death. The tragedians, and especially Euripides, basing their work on the later epics, developed her story, and it served as a source for still later poets. Before the birth of Paris she dreamed that she bore a blazing torch which fired the whole city. From dread of the meaning of this omen, Paris was exposed. Another episode was her vengeance on Polymestor, King of Thrace, to whom Priam had sent his son Polydorus and much treasure for safe-keeping. Polymestor murdered his ward, and threw the body into the sea, which bore it to the shore of the Troad, where it was discovered by a servant of the now captive Hecuba. She then enticed Polymestor to her tent, and with her attendants slew his sons before his eyes and blinded him. The loss of Polydorus was only one of her sufferings after the capture of Troy, for she saw her husband and her sons slain, her grandson, Astyanax, son of Hector, thrown from the walls of Troy, and her daughter Polyxena sacrificed at the tomb of Achilles, while the lot assigned her as slave to her most hated enemy, Odysseus. The legends of her end varied, as in one version she was transformed into a dog, which sprang into the sea and was drowned, while in another her lamentations and curses so angered the Greeks that they stoned her. Her name became proverbial for a sorrowful fate.

HECUBA, or **HEC'ABE**. A tragedy by Euripides, produced about B.C. 424. It deals with the revenge of the Trojan matron on Polymestor, King of Thrace, who had murdered her youngest son, Polydorus, previously consigned by Priam to his guardianship. The tragic pathos of the play is also heightened by the introduction in the first part of the story of Polyxena, the daughter of Hecuba, who was sacrificed by the Greeks to the shade of Achilles. The play is somewhat lacking in unity.

HECYRA, hĕs'ĭ-rà (Lat., from Gk. *Ἑκυρά*, mother-in-law). A comedy by Terence, produced in B.C. 165. The play, which is based on an unknown Greek comedy, lacks plot, and was at first unsuccessful.

HEDA, hā'dà, WILLEM CLAESZ (1594-c.1678). A Dutch painter, born probably at Haarlem. He was one of the most famous of the still-life painters, and also attempted historical subjects, but with little success. He was dean of the Haarlem Guild in 1631 and in 1651, but aside from this nothing is known of the events of his life. There is a "Dessert" by him in the Louvre, dated 1637. His other pictures are in the German galleries, notably some breakfast subjects in Munich, Dresden, and Nuremberg.

HEDBERG, hĕd'bĕr y', FRANS TEODOR (1828—). A Swedish dramatist, born at Stockholm. He had tried various professions, including that of actor and wig-maker, before he set seriously to

work as a dramatist (1854). Afterwards he was appointed reader, and then teacher, at the Royal Theatre in Stockholm (1861), and later director of the New Theatre, Gothenburg (1881). In 1883 he gave up this position to devote himself entirely to writing. His works include comedies, tragedies, adaptations, translations, vaudevilles, and poems. The best known of his plays is *Bröllopet på Ulfåsa* (1865). He also wrote: *Karaktäristiker och Porträter af Svenska Skådespelare* (1884), and *Karaktäristiker och Porträter af Svenska Operasångare* (1885), besides other works dealing with theatrical subjects.

HEDDA GABLER, hĕd'dä gä'blĕr. A play by Hendrik Ibsen (1890), and the name of its heroine, an eccentric woman who, disappointed in her marriage with a young savant, attempts to regain her influence over a former lover, Eilert, now under the good influence of a former school friend of Hedda. He loses the manuscript of a new work which is to make him famous, and Hedda's husband finds it, but she destroys the work. When Eilert, in despair, thinks of suicide, she gives him a pistol with which he ends his life in a low resort, and Hedda kills herself.

HED'DING, Elijah (1780-1852). An American clergyman, bishop of the Methodist Episcopal Church. He was born in Pine Plains, Dutchess County, N. Y., and began to preach in Vermont when nineteen years old. During most of the time between 1807 and 1824 he was presiding elder in New Hampshire, in Portland, Maine, and in Boston. In 1824 he was elected bishop, and during the formative period of the Church's growth he exercised a powerful influence. He was one of the founders of *Zion's Herald*, the first Methodist paper in the country, and author of a *Manual of Discipline*.

HEDDLE, or **HEALD** (of Scandinavian origin; cf. Icel. *hafald*, thrum for holding the weft). In weaving, the threads of the warp are so arranged that at each passage of the shuttle backward and forward, a certain number of the warp threads are raised up, and the remainder drawn down; this is done with vertical threads, cords, or wires, with a small loop in the middle through which the warp thread is passed, there being one of the vertical threads for each horizontal or warp thread. These threads or wires are known as heddles or healds. See Loom.

HEDENSTIERNA, hä'den styĕr-nä, Karl Joseph Alfred (1852—). A Swedish author, born at Wedåsa (Småland province). In 1879 he became connected with the staff of the *Smålands Posten* at Wexiö, and in 1890 was made editor-in-chief of that journal. In addition to several volumes descriptive of Swedish peasant life, he wrote a series of humorous articles, published weekly in the *Posten* over the name 'Segurd,' and in part collected in a translation into German by Krusenstierna and Langfeldt, entitled *Allerlei Leute* (Leipzig, 1892-97).

HEDGE (AS. *hecg*, *hege*, OHG. *hecga*, *hegga*, Ger. *Hecke*, hedge; connected with AS. *hege*, Eng. *hay*, and AS. *hēawan*, Eng. *hew*). A fence formed generally of growing shrubs or trees and cultivated either for defense or ornament. Hedges are much used in England, Italy, and in other countries where wood for fences is scarce. For many situations, they are particularly adapted, owing to the protection which they afford from high winds. The height to which they are permitted to grow should be accommodated to the requirements of the locality. Hedges in Great Britain are generally formed of hawthorn (q.v.). Beech hedges are very common around gardens and pleasure grounds, and a hedge of beech and hawthorn mixed is common in many places. Holly makes an excellent ornamental hedge, much in use for gardens and pleasure grounds. Ornamental hedges are sometimes formed of yew, hornbeam, lime, and other trees. In the United States, osage orange (*Maclura aurantiaca*) and honey-locust (*Gleditschia triacanthos*) are considered the best hedges for fence purposes. For ornamental hedges California privet (*Ligustrum ovalifolium*), Norway spruce (*Picea excelsa*), American arbor-vitæ (*Thuja occidentalis*), common hemlock (*Tsuga Canadensis*), Japan quince (*Cydonia japonica*), *Deutzia scabra*, and some spireas and viburnums are used.

HEDGE, Frederic Henry (1805-90). An American clergyman, critic, and philosopher, born at Cambridge, Mass. He was a son of Levi Hedge, professor of logic and metaphysics in Harvard College. He studied in Germany under the care of George Bancroft from 1818 to 1823, and graduated at Harvard (1825), and from the Divinity School at Cambridge in 1828. He was a Unitarian pastor successively at West Cambridge (1829), Bangor, Maine (1835), Providence, R. I. (1850), Brookline, Mass. (1856), and in 1857 was made professor of ecclesiastical history in the Harvard Divinity School, and editor of the *Christian Examiner* (1857-60). From 1872 to 1881 he was professor of German at Harvard. To literary criticism he contributed *Prose Writers of Germany* (1848), and *Hours with German Classics* (1886); to religious and philosophical criticism: *Reason in Religion* (1865); *The Primeval World of Hebrew Tradition* (1870); *Martin Luther and Other Essays* (1888). He wrote also several hymns and translations from the German poets, and prepared a liturgy for the Unitarian Church (1856). His chief significance to American thought was his introduction of German scholarship and literature.

HEDGEBOTE. See Haybote.

HEDGEHOG. One of a genus (Erinaceus) of insectivorous quadrupeds, the type of the family Erinaceidæ. The muzzle is rather elongated, the neck short, the limbs short, the feet five-toed, the claws strong, the tail short, the body covered with short spines on the upper part, and with hair below, and capable of being rolled up into a ball. The teeth are 36 in number, 20 in the upper jaw and 16 in the lower; the middle incisors are very long, and stand forward. Like many other insectivora, hedgehogs are by no means limited to insect food, but prey on larger animals, as reptiles, small quadrupeds, and birds; they are fond of eggs and of milk, and in confinement will readily eat soaked bread, cooked vegetables, or porridge. Their power of rolling themselves into a ball, from which the spines project on every side, is their means of protection from enemies. The spines are curiously bent near the root, and so set, that on the contraction of the muscles by which the animal rolls itself up they are held firmly in their position, their points toward the adversary. They are very strong and sharp, and their elasticity is so great that the animal

can sustain falls from considerable heights without apparent injury.

The common hedgehog (*Erinaceus Europæus*) is a native of all Europe and of Western Asia. Its short ears are one of its distinctive specific characters. It is seldom more than nine and a half inches in length. Its spines are about an inch long. It readily kills snakes, and even vipers, which it eats, beginning always at the tail. It brings forth from two to four young at a birth, and provides for the occasion a curiously constructed nest, mostly of dry leaves, of which the roof is capable of throwing off the rain. The young are blind at first, their ears are closed, and their bodies are covered with soft, incipient spines. In winter the hedgehog becomes torpid, retiring to a hole at the base of a tree, beneath roots, or in some such situation. It provides no winter store, and few animals hibernate so completely. The hedgehog is easily tamed, becomes very familiar, and is very useful in houses where cockroaches are troublesome. Night is its period of activity. Its flesh is eaten in some parts of Europe, but in Great Britain only by gypsies, who roll the animal up in a ball of clay, and so roast it. About eighteen other species of hedgehogs are found in different parts of Asia and Africa, but no closely related animal is included in the American fauna. See Plate of PORCUPINES AND HEDGEHOGS.

HEDGEHOG PLANT (so called from the shape). A name given to those species of medic (Medicago) in which the pods are spirally twisted and rolled up into a ball, beset with spines. The peculiar appearance of the pods makes them objects of interest, on which account they sometimes find a place on flower borders. Like other medics, they are useful as sheep and cattle food in countries where they abound. They are particularly plentiful on sandy grounds near the sea in some parts of South America, and their bur-like pods are often abundant in South American wool.

HEDGE-HYSSOP. See GRATIOLA.

HEDGE-MUSTARD, *Sisymbrium.* A genus of plants of the natural order Cruciferæ, mostly annual or perennial herbs, with various foliage, yellow or white flowers, and long, roundish or six-angled pods. Several species are natives of Europe, of which one, the common hedge-mustard (*Sisymbrium officinale*), was once employed in medicine for catarrh and other ailments, and still is sometimes cultivated as a pot-herb on account of its mild pungency. It is abundantly introduced into the United States, where it is considered a troublesome weed. Broad-leaved hedge, or London rocket (*Sisymbrium irio*), is said to have sprung up in great abundance on the ground desolated by the fire of London in 1666. There are a number of other weedy species. *Sisymbrium Sophia* is sometimes known as flixweed. *Sisymbrium Alliaria* has a garlic-like odor.

HEDGE-NETTLE. See STACHYS.

HEDGE-SPARROW, HEDGE-WARBLER, or DUNNOCK. A familiar European warbler (*Accentor modularis*). It is not quite as large as the house-sparrow, which it somewhat resembles in dull brownish plumage, but in little else. It feeds principally on insects. It is one of the earliest spring songsters, having a sweet plaintive song. The nest, of green moss, roots, and wool, lined with hair, is usually placed rather low in a bush or hedge. The eggs are four or five in number, of a delicate and spotless bluish green.

HEDIN, hē-dēn′, SVEN ANDERS (1865—). A Swedish explorer, born at Stockholm, and educated there and at Upsala (1885), at Berlin and at Halle, where, in 1892, he received the doctorate. He traveled in Southwestern Asia in 1885-86, and gave an account of his journey in *Genom Persien, Mesopotamien och Kaukasien* (1887); was a member of the Swedish commission to Teheran, which he described in *Konung Oscar's beskickning till Schahen af Persien* (1891); and in *Genom Khorasan och Turkistan* (1892) told of his experiences in Central Asia in 1890-91. In the years 1894 to 1897 he traveled through East Turkestan, the Pamir, the Takla-Makan Desert, northern Tibet, and the Desert of Ordos, reaching Peking and returning west through Mongolia and Siberia, and in the latter year won the Karl Ritter medal from the Berlin Geographical Society. These remarkable journeys, performed at times amid extraordinary hardships, were described in the book, *Through Asia* (1899), which made the author's reputation in England and America; and, less popularly, in *Petermanns Mitteilungen* (1900): "Die geographisch-wissenschaftlichen Ergebnisse meiner Reisen in Central Asien, 1894-97." Hedin's expedition of 1899 to 1902 explored the lower course of the Tarim, the country between it and the Tchertchen-Darya, the region of Lob-Nor, the Desert of Gobi, and the greater part of Tibet. He made two unsuccessful attempts to enter the sacred city of Lhasa. Hedin accepted invitations to visit America for a course of university lectures for the early part of 1903.

HEDJAZ, hē-jäz′ (Turk., land of pilgrimage). A Turkish vilayet of Arabia (q.v.), extending along the northeast shore of the Red Sea from the Gulf of Akabah to about the parallel of 20° N. (Map: Turkey in Asia, P 10). It reaches to the Nefud Desert on the east. Its area is estimated at 96,500 square miles. The district is barren, being covered with sand and eruptive material. In parts of the interior there are mountains reaching an altitude of about 6000 feet. The country is traversed by numerous wadis. The climate is hot and dry, and vegetation is found only in a few oases. The population is estimated at about 300,000, consisting of Bedouins, many of whom are engaged in the plundering of caravans. Hedjaz is important in the Mohammedan world, for within its confines are the two sacred cities of Mecca and Medina. The chief port is Jeddah.

HEDLINGER, hĕd′ling-ẽr, JOHANN KARL (1691-1771). A Swiss stamp-cutter, born at Schwyz. He completed his studies in Paris, and then went to Sweden, where he was appointed royal medalist in 1718. His pupil, Fehrman, succeeded him as a medalist to the King, and finished from his designs a series of portraits of Swedish sovereigns. His works were published with a French text by C. de Michel (1778, forty plates), and with a German text by J. C. Füszli and J. E. Haid (1781-82, eighty plates).

HED′ONISM (from Gk. ἡδονή, *hēdonē*, pleasure: connected with ἡδύς, *hēdys*; Lat. *suavis*, Goth. *suts*, OHG. *suozi*, Ger. *süss*, Eng. *sweet*, Skt. *svādu*, sweet, from *svad*, to make pleasant, to taste). The theory that pleasure is the high-

est good in human life. (See ETHICS.) In Occidental speculation this view appeared very early, and was vigorously asserted by many sophists (q.v.). Aristippus (q.v.) and his school (see CYRENAIC SCHOOL) made hedonism their central doctrine. Aristippus seems, at least at times, to have insisted upon the supreme value of the pleasure of the moment, and to have lost sight of the necessity, even according to hedonism, of taking account of the future. But while many of the sayings attributed to him have this irrational character, the value he set upon insight would seem to indicate that it was not his intention to hold up as ideal the man who completely ignored all the hedonic consequences of his action. Epicurus (q.v.) laid more emphasis on the desirability of choosing 'productive' pleasures, to use Bentham's nomenclature; i.e. pleasures whose consequences are not painful. But however they differed in other points, all the ancient hedonists were agreed that the pleasure of the agent was, for the agent himself, the supreme end. A disinterested desire for some one else's good was not recognized as possible; or, if possible, it was regarded as perverse. Early modern hedonists (see HOBBES and LOCKE) were almost or quite as individualistic as the ancients. But with Cumberland, Hutcheson (q.v.), and Hume (q.v.), a new phase of hedonism was introduced, viz. the theory that not the agent's greatest pleasure, but "joy in widest commonalty spread," is the supreme end of mortal action (Universalistic hedonism, or Utilitarianism, q.v.). There is also another distinction between ancient and modern hedonism. It was characteristic of Greek and Roman pleasure theories that they rested on the principle that every man, or at least every normal man, always seeks his own pleasure. In other words, the ancient theory rested on an alleged psychological fact, and has therefore been called *psychological* hedonism. Some modern authors take the same position; but the prevailing tendency in modern hedonism is to assert, not that every man always *actually* seeks his own pleasure, but that he *ought* to seek the greatest pleasure, whether of himself or of humanity, or of all sentient creatures. This is *ethical* hedonism.

Psychological hedonism is controverted by well-known facts. So far is man from always seeking pleasure, that in most of his actions he has no thought of pleasure. He acts from automatic impulse, from instinct, from habit, from desire for certain objective ends, as well as occasionally from desire for pleasure. It has even been denied that there can be any desire for pleasure, although this is, without doubt, an extreme position. The tendency among many writers at the present day is to maintain that the affections, i.e. pleasantness and unpleasantness, are the motives or mainsprings of *voluntary* action, and not that pleasure and the avoidance of pain is the *end* of action. The difference between a motive and an end is that between an efficient and a final cause (see CAUSALITY), although it should be remarked that motive is often used as synonymous with end. This view that the affections are the motives of actions, so far as these actions are voluntary, is not to be confused with hedonism, which is a theory of ends, not of cause.

Ethical hedonism is beset at the outset with one great difficulty. It is often argued that hedonism is not practicable unless all pleasures can compare in some way with each other. Who shall say whether the pleasures of the table are greater or less than those of the opera? The question can be only approximately answered by each individual according to his own tastes. And even such an answer can claim no uniform applicability. At one time, e.g. when extremely hungry, even the most enthusiastic lover of music might prefer beefsteak to Wagner, while just after an epicurean banquet the gourmand might temporarily prefer music. The greatest sum of pleasures either for the agent or for the race would be a very difficult ideal to set before one, except in the abstract—too difficult, perhaps, to make it the criterion of morality for the ordinary man. But the difficulty of it must not be a bar, if, on sufficient ground, it can be proved that man *ought* to seek the greatest pleasure either of himself or of others. What obligation means and how it relates itself to pleasures and desires is discussed elsewhere. (See ETHICS.) After that discussion it may be said that hedonism has no scientific basis. Consult the authorities referred to under UTILITARIANISM; ETHICS.

HÉDOUIN, ȧ′dwăn′, EDMOND (1820-89). A French painter, born at Boulogne-sur-Mer. He studied under Delaroche and Nanteuil, and first attracted attention by his "Woodcutters of the Pyrenees," exhibited in 1844. His best works are scenes of Spanish peasant life. He also produced some decorative paintings for the foyer of the Théâtre Français in Paris. One of his landscapes is "Gleaners Overtaken by Storm" (1857), in the Luxembourg. In engraving, Hédouin's work for an edition of Molière (1881-89) may be noted.

HÉDOUVILLE, ȧ′dōō′vēl′, GABRIEL MARIE JOSEPH THÉODORE, Count d' (1755-1825). A French general and diplomat, born at Laon, and educated at La Flèche and at the Military School. In 1797 he was made Governor of Santo Domingo, but was unable to cope with Toussaint L'Ouverture, and returned to France two years afterwards. In 1801 he was made Minister to Russia, in 1805 went on diplomatic missions in Italy, and, with Josephine, to Strassburg and Munich. After the peace with Austria he was Plenipotentiary at Frankfort, but in 1814 voted for the overthrow of the Empire. He was made count in 1818, and was appointed to the commission on the disputes between France and the Grand Duchy of Warsaw.

HEDWIG, hĕd′vĭk (1174-1243). The patron saint of Silesia, a daughter of Berthold IV. of Meran. In her twelfth year she was married to Duke Henry I. of Silesia, who died in 1238. She entered a Cistercian cloister which she had founded near Breslau, and died there.

HEDWIG, or **JADWIGA**, yȧd-vē′gȧ (1371-99). A Queen of Poland, daughter of Louis the Great of Poland and Hungary. After his death (1382) the Poles put her on the throne. In 1386 she married Jagellon of Lithuania, who embraced Roman Christianity and became known as Wladislaw (Ladislas).

HEEL-FLY. A local name in the Southern and Western States for the ox bot-fly (*Hypoderma lineata*), derived from the fact that the

adults hover around the heels of cattle for the purpose of laying their eggs on the hairs, whence they will be licked off. See BOT.

HEEL-FLY.

HEEM, hām, JAN DAVIDSZ DE (1606-84). The most celebrated painter of 'still life' that the Dutch School has produced. He was born at Utrecht, and studied under his father, a painter of still life. We know but little of his life. In 1620, and during the years following, he was active at Leyden, and in 1635 he became a member of the Painters' Guild of Antwerp. In 1667 he returned to Utrecht, but during the French invasion of 1672 he fled to Antwerp, remaining there until his death in 1684. Heem's pictures represent for the most part splendid vases of fruits and flowers, musical instruments, and ornaments of various kinds. His work was popular and commanded high prices. His works are to be found in nearly all the principal galleries of Europe, especially in those of Holland, Belgium, and Germany. They show exquisite coloring, unsurpassable chiaroscuro, faultless arrangement, and a fine observation of nature, which he imitates with microscopic fidelity.

HEEMSKERK, hāms'kĕrk, or **HEMSKIRK**, MARTIN VAN (1498-1574). A Dutch painter, whose name was Martin van Veen, but who was called Heemskerk from the place of his birth. He studied under Scorel, from whom he got a liking for Italian art which he displayed, particularly in his imitation of Michelangelo, whose works influenced him strongly when he saw them on his visit to Rome in 1532. Many of his pictures were destroyed by the Spaniards during the sack of Haarlem (1572). Among those still existing are: "Saint Luke Painting the Virgin" (1532), "Adoration of the Shepherds," "The Brazen Serpent," "Last Judgment," and "Triumph of Silenus."

HEEP, URIAH. A very 'umble' person and a most egregious hypocrite in Dickens's *David Copperfield*. He is a clerk in Mr. Wickfield's law office, gains absolute ascendency over that benevolent but singularly weak character, and is prevented from ruining him only by being exposed by Micawber.

HEER, hār, OSWALD (1809-83). A Swiss naturalist, born at Nieder-Utzwyl. He was director of the botanical gardens at Zurich (1835-83), and also professor of botany at the university and at the Polytechnicum. His earliest publications were on entomology, but his most important contributions to science were his works on the fossil plants and insects of the Tertiary period, notably *Flora Tertiaria Helvetiæ* (1854-56); *Die Urwelt der Schweiz* (1865-79); *Flora Fossilis Helvetica* (1877); *Flora Fossilis Arctica* (1865-83). Consult: J. J. Heer and Schröter, *Oswald Heer, Lebensbild eines schweizerischen Naturforschers* (Zurich, 1885-87); and Malloizel, *Oswald Heer, Bibliographie et table iconographique* (Berlin, 1888).

HEEREN, hā'rĕn, ARNOLD HERMANN LUDWIG (1760-1842). An eminent German scholar, born at Arbergen, near Bremen, where his father was at that time pastor, and educated at the cathedral school of Bremen, and at the University of Göttingen. His first published work was an edition of Menander's *De Encomiis* (1785), and somewhat later appeared the *Eclogæ Physicæ et Ethicæ* of Stobæus (1792-1801). In collecting materials for the latter he visited Italy, the Netherlands, and France. In 1794 he was appointed professor of philosophy, and in 1801 professor of history at Göttingen. In 1793-96 appeared at Göttingen his *Ideen über Politik, den Verkehr und den Handel der vornehmsten Völker der alten Welt* (4th ed. 1824-26). This work has secured him a place among the most eminent modern historians, and is still of much value. If his *Geschichte des Studiums der Klassischen Litteratur seit dem Wiederaufleben der Wissenschaften* (1797-1802) proved less satisfactory to scholars, his *Geschichte der Staaten des Altertums* (5th ed. 1826) and his *Geschichte des europäischen Staatensystems und seiner Colonien* (4th ed. 1822) abounded in new views and acute expositions. For his *Versuch einer Entwickelung der Folgen der Kreuzzüge* (1808) he received the prize from the Institute of France. His *Vermischte historische Schriften* (1803-08) contain some very interesting treatises. In 1821-26 he published an edition of all his historical works (*Historische Werke*) in fifteen volumes.

HEEREN, FRIEDRICH (1803-85). A German chemist, nephew of the historian Arnold Hermann Ludwig Heeren, and born at Hamburg. Educated at Göttingen and Paris, he was for two years engaged with his brother in the manufacture of stearin and whale-oil candles in Hamburg, and in 1831 became professor of chemistry in the institute of technology at Hanover. He patented a machine for testing milk, wrote on chemical dyes, and published a *Technisches Wörterbuch* (with Karmarsch, 1841-44; revised by Kick and Gintl, 1874-92), a free translation of Ure's *Dictionary of Arts, Manufactures, and Mines*, and a standard work of reference.

HEFELE, hā'fe-le, KARL JOSEPH VON (1809-93). A Roman Catholic bishop and scholar. He was born at Unterkochen, not far from Stuttgart, Württemberg, March 15, 1809; graduated at Tübingen, and in 1840 received a professorship in the Catholic theological faculty, where he lectured on Church history, Christian archæology, and patrology. From 1842 to 1845 he was a member of the Württemberg Chamber of Deputies. He was consecrated Bishop of Rottenburg in 1869, and took a prominent part in the Vatican Council, where he was foremost among those who spoke and voted against the dogma of Papal infallibility. At first he refused to proclaim it in his diocese, but on April 21, 1871, did so, and in 1872 gave his public assent to it. In 1874 he declined the Archbishopric of Freiburg offered to him by the Baden Government, on the ground that he could not take the oath which was demanded from the bishops in Prussia and Baden. His most important work, based on the study of original materials, is the *Conciliengeschichte*, a history of the councils of all grades, in nine volumes. Hefele's part of the work extends to the Council of Florence, but with Hergenröther's appendix, the work goes to Trent. The English translation (Edinburgh, 1871-96, 5 vols.), goes as far as 738. Hefele's *Life of Ximenes*

(1844) has been translated (London, 1860). He died in Rottenburg June 5, 1893.

HEF'FERNAN, Mr. Michael. The nom-de-plume which Samuel Ferguson signed to *Father Tom and the Pope, or a Night at the Vatican.*

HEFFTER, hĕf'tĕr, August Wilhelm (1796-1880). A German jurist, educated at Berlin and Leipzig. He was made professor at Bonn (1823), at Halle (1830), and at Berlin (1832). From 1849 he was a member of the First Chamber; in 1861 was appointed Crown Syndic and became as such life member of the Prussian Upper House. He wrote: *Institutionen des römischen und deutschen Civilprozesses* (1825); *Das europäische Volkerrecht der Gegenwart* (8th ed. by Geffken, 1888); *Lehrbuch des gemeinen deutschen Strafrechts* (6th ed. 1857); and *Die Sonderrechte der souveränen und mediatisierten Hauser Deutschlands* (1871); and, on current history, *Der gegenwärtige Grenzstreit zwischen Staats- und Kirchengewalt* (1839).

HEFNER-ALTENECK, hĕf'nĕr äl'te-nĕk, Jakob Heinrich von (1811-1903). A German historian and art critic. He was born in Aschaffenburg, and while still a child he lost the use of his right arm, but nevertheless became an excellent draughtsman. He made a specialty of the history of art, especially of the Middle Ages. He was made successively professor of designing (1835), conservator of the art collection of Munich (1853), of the Royal Museum of Engravings (1863), and conservator-general of the art collections of Bavaria and director of the National Museum (1868). His retirement in 1886 did not put a stop to his literary activity. The more important of his works are: *Trachten, Kunstwerke und Geratschaften vom frühen Mittelalter bis Ende des 18. Jahrhunderts* (2d ed. 1879-90); *Hans Burgkmaiers Turnierbuch* (1854-56); *Eisenwerke oder Ornamentik der Schmiedekunst des Mittelalters und der Renaissance* (1861-87); *Originalentwürfe deutscher Meister für Prachtrüstungen französischer Könige* (1865); *Originalzeichnungen deutscher Meister des 16. Jahrhunderts zu ausgeführten Kunstwerken für Könige von Frankreich und Spanien* (1889); *Deutsche Goldschmiedewerke des 16. Jahrhunderts* (1890); and *Lebenserinnerungen* (1899).

HEGAR, hā'gär, Friedrich (1841—). A German composer, born at Basel. He studied at the Leipzig Conservatory under several famous teachers, and in 1860 became leader of the Bilse Orchestra at Warsaw. In 1863 he settled in Zurich, where he became a well-known conductor, and in 1876 founded a school of music. He composed some piano and violin music, but became best known for his male choruses and songs. His oratorio, "Manasse," was highly successful, and is a striking work.

HEGEL, hā'gel, Georg Wilhelm Friedrich (1770-1831). One of the greatest German philosophers. He was born August 27, 1770, at Stuttgart, and became in 1788 a student in the University of Tübingen, where his speculative abilities, however, were outshone by his younger companion, Schelling, who, together with Hölderlin, exercised a great intellectual influence on him. In the university he studied theology, philosophy, and natural science, and was interested in political events and theories. His diploma described him as having good parts, but did not mention him as distinguished for his knowledge, philosophical or otherwise. After leaving the university in 1793, he was a private tutor at Bern and Frankfort-on-the-Main for seven years, during which period he continued his studies in philosophy and theology, and wrote a *Life of Jesus*, which, however, was never published. In the beginning of 1801 he left Frankfort for Jena, where he published his first work, *Ueber die Differenz des Fichteschen und Schellingschen Systems der Philosophie* (1801), and entered the university as privat-decent. Next year he joined Schelling, to whose philosophy he seems at this time to have adhered, in the editorship of the *Kritisches Journal der Philosophie.* This alliance did not last long, and soon turned into philosophical antagonism. His lectures in Jena did not attract much notice, but it was at this place, while the din of the battle in 1806 was sounding through the town, that he completed his first important work, *Phänomenologie des Geistes* (1807), which he used afterwards to call his voyage of discovery. Shortly before the battle he had been made professor extraordinarius of philosophy; but the disaster which the war brought upon Jena compelled him to seek means of subsistence elsewhere, and he went, accordingly, at Niethammer's request, to Bamberg, where he edited a political paper for a year or two. In 1808 he was appointed rector of the gymnasium at Nuremberg, and there he had just completed the first edition of his *Wissenschaft der Logik* (1812-16), when he was called in 1816 to a professorship of philosophy in Heidelberg. There he published his *Encyklopädie der philosophischen Wissenschaften* (1817), in which he first developed his complete system. In 1818, however, he was called to Fichte's place in Berlin, and it was here that he first began to gather around him a new philosophical school. His lectures, which were delivered without rhetorical ornament, yet with an impressiveness due to the expression of laborious thought, attracted hearers from all ranks and professions. He rose to great political influence by reason of his defense of existing political institutions. This defense subsequently led his critics to charge him with time-service; the charge, however, does him a great injustice. In 1821 he published his *Grundlinien der Philosophie des Rechts*, in which he gave expression to his ethical and political views. He demands in that work, among other things, representation of the people, freedom of the press, publicity of judicial proceedings, trial by jury, the administrative independence of corporations, and, above all, a monarch who shall "put the dot over the *i*," i.e. complete the constitution of the State. In the midst of an active life he was suddenly cut off by cholera, November 14, 1831. He was buried beside Fichte. A complete collection of his works was published in eighteen volumes (Berlin, 1832-41), some of them compiled from notes taken by his students. Of his works translated into English may be mentioned: *Philosophy of Mind* (Oxford, 1894), and *Logic* (ib., 2d ed. 1892), translated by Wallace, both of which are portions of the *Encyklopädie; Philosophy of Right*, translated by Dyde (London, 1896); *Philosophy of Religion*, translated by Spiers and Sanderson (ib., 1895); *Philosophy of History*, translated by Sibreener (ib., 1857); *History of Philosophy*, translated by Haldane and Simpson (ib., 1892); *Hegel's Doctrine of Reflection*, translated by W. T. Har-

ris, book ii. of *Greater Logic* (New York, 1881); and portions of book i. of the *Greater Logic* by J. H. Stirling in his *Secret of Hegel* (2d ed., Edinburgh, 1897).

It is impossible in this article to give any detailed account of Hegel's system of philosophy. He called it the system of the Absolute Idea. The idea is, for him, the indissoluble unity of the universe, existing in the two polar distinctions of subject and object. This idea is absolute because all-inclusive. The method by which Hegel arrived at this result he called dialectic (Dialektik), and by this he meant the process of exhibiting the incomplete character of any conception except the all-inclusive conception of the Absolute Idea. Thus in his *Logik*, which expounds the method, Hegel begins with the conception of Being (Sein), and shows that it is not a complete conception; i.e. that it cannot be thought by itself. It is always only a part conception and has no independence. The other part conception is Naught (Nichts). These two parts are not put together in any external way, but each is originally connected with the other. The organic unity of the two part conceptions he calls Becoming (Werden). In the same way Becoming is not a complete thought; it is only part of a larger thought, which in its turn is part of a still larger, till at last we reach the thought of the Absolute Idea. But the *thought* of the Absolute Idea is itself only a partial fact if it is conceived as a mere conception, i.e. as something that has existed only "in the abstract medium of pure thought." Thought must have its objects. These objects we may try to conceive as existing apart from thought, but this conception is in its turn shown to be as incomplete as that of thought without object. The Absolute Idea then is not a conception in the ordinary sense of the word, but it is a fact, the fact of the inevitable union of thought and object of thought. Again, the inseparability is not spatial, but temporal. That is to say, Hegel does not mean that the act of thinking and the object thought must be in the same place or at the same time. All that he means is that whatever may be the temporal relation between the act of thinking and the object thought, the latter cannot be conceived as existing except either as an actual object of thought or as standing in intelligible relation to some actual object of thought, just as the act of thinking cannot exist except in thinking some object. Though an interval of time may separate subject and object, an object which stands out of all relation to a subject or a subject which stands out of all relation to an object is inconceivable. In other words, all reality is one, in the sense that all real things, physical or psychical, are interconnected in such ways that their several reality is not something they have in isolation from the system of real things of which each is an integral part. Hegel's theology and the other parts of his system, such as the philosophy of law, of nature, of art, and of mind, are too subtle to admit of treatment here. Indeed, even the short sketch of the system as a whole, given above, would be rejected by many students of Hegel as inaccurate, so difficult is the task of interpreting Hegel. Hegelianism is a term commonly employed to denote some supposed agreement with his views, but most thinkers who stand close to Hegel fight shy of the term because of the indefiniteness of its connotation. A thinker of the present day, therefore, hardly ever calls himself an Hegelian. Four years after Hegel's death, a controversy was raised among his followers by Strauss's *Leben Jesu* (see STRAUSS), and was further imbittered by Strauss's *Christliche Glaubenslehre*. The Hegelians then split into three sections, called severally, the right, the left, and the centre, accordingly as they represented supernaturalism, naturalism, or a mediating tendency. The first section was represented, among others, by G. A. Gabler, H. T. W. Hinrichs, and K. T. Göschel; the leftists, by Bruno Bauer, Feuerbach, Strauss, and K. L. Michelet; the centrists, represented by J. K. Rosenkranz, J. E. Erdmann, and W. Vatke, Weisse, I. H. von Fichte, the younger Ulrici, Fischer, and Carrière, were named pseudo-Hegelians, because, though retaining a large element of Hegel's doctrine, they did not follow closely the Hegelian tradition as represented by the three schools. Hegel's philosophy has had great influence in other countries than Germany, notably on British and American thought. T. H. Green (q.v.), J. Caird, E. Caird, W. Wallace, J. H. Stirling, B. Bosanquet, F. H. Bradley, H. Jones, J. Watson, D. G. Ritchie, A. S. Pringle-Pattison, in Great Britain, and G. S. Morris, W. T. Harris, and J. Dewey, in the United States, have been more or less influenced by Hegel, although many of these thinkers have attacked Hegelianism. In Germany the encouraging patronage extended by the Prussian Government created in the later years of his life a great professorial constituency of Hegelians. But the metaphysical excesses of these Hegelians led to a violent reaction, the effects of which have lasted to the present day. For various views of his system, consult: Trendelenburg, *Logische Untersuchungen* (Berlin, 1840, 3d ed. 1870); Ulrici, *Ueber Princip und Methode der Hegelschen Philosophie* (Halle, 1841); A. Schmid, *Entwickelungsgeschichte der Hegelschen Logik* (Regensburg, 1858); Janet, *Etudes sur la dialectique dans Platon et dans Hegel* (Paris, 1865); Stirling, *The Secret of Hegel* (Edinburgh, 2d ed. 1897); Harris, *Hegel's Logic* (Chicago, 1890); Caird, *Hegel* (London, 1883); Bosanquet, *Introduction to Hegel's Philosophy of Fine Art* (London, 1886), containing also translations of selected portions of Hegel's writings on æsthetics; Morris, *Hegel's Philosophy of the State and of History* (Chicago, 1888); Seth (Pringle-Pattison), *Hegelianism and Personality* (Edinburgh, 2d ed. 1893); McTaggart, *Studies in the Hegelian Dialectic* (Cambridge, 1896); Noel, *La logique de Hegel* (Paris, 1895); Schmitt, *Das Geheimniss der Hegelschen Dialektik* (Halle, 1888); Baillie, *Hegel's Logic* (London, 1901); Stibben, *Hegel's Logic* (New York, 1902); the philosophical works of Rosenkranz and of K. L. Michelet; and the histories of modern philosophy by Ueberweg and Heinze, Windelband, Höffding, and Erdmann. For his life, consult Rosenkranz, *Hegels Leben* (Berlin, 1844); Haym, *Hegel und seine Zeit* (Berlin, 1857).

HEGEL, KARL VON (1813-1901). A German historian, elder son of the philosopher. He was born at Nuremberg; studied philosophy, theology, philology, and history at Berlin and Heidelberg; was assistant at the Köllnische Gymnasium in Berlin, became professor of history at Rostock (1841) and at Erlangen (1856). He was chief editor of *Chroniken der deutschen*

Städte vom 14. bis ins 16. Jahrhundert (1862-99). His principal work is *Geschichte der Stadteverfassung von Italien* (1847); and among his other works the more important are: *Die Chronik des Dino Compagni* (1875); *Ueber den historischen Wert der ältern Dante-Kommentare* (1878); *Briefe von und an G. W. F. Hegel* (1887); *Städte und Gilden der germanischen Völker im Mittelalter* (1891); *Die Entstehung des deutschen Städtewesens* (1898); and *Leben und Erinnerungen* (1900).

HEGELUND, hā'ge-lụn, PEDER JENSEN (1542-1614). A Danish dramatist, born at Ribe. He studied at Copenhagen, Leipzig, and Wittenberg, was made rector of the school at Ribe (1569), dean of the cathedral, and Bishop of Ribe (1595). A number of his plays and an historical work are lost, but several of his poems, and a play, *Susanna*, translated from Xystus Bitulejus, which he arranged for pupils, and which was acted at Ribe (1576), have been edited by S. Birkit Smith (1890-91).

HEGE'SIAS (Lat., from Gk. Ἡγησίας, *Hēgēsias*). A Cyrenaic philosopher, who flourished about 300 B.C. He was a Hedonist and a follower of Aristippus, but taught that a life of pure pleasure was unattainable, and therefore not to be sought. The chief aim of life was freedom from pain. Therefore, it was the part of true wisdom to cultivate a state of absolute indifference to all pleasure. In his doctrine he set forth the desirability of suicide as a means of escaping the sorrows of this life so eloquently that Cicero tells us Ptolemy forbade his teaching as pernicious. From this advocacy of suicide he was given the nickname πεισι-θάνατος, or 'Death's advocate.'

HEG'ESIP'PUS (Lat., from Gk. Ἡγήσιππος). A Christian writer of the second century. He was probably of Jewish descent and born in the East, whence he went to Rome, stopping at Corinth on the way. He is supposed to have died about 189. While at Rome he composed a work, *Hypomnemata*, in five books, which was probably directed against the Gnostics, and may have been in some sense a history of the early Church. It is known only from fragments, mainly in Eusebius. Another work on the wars of the Jews (also in five books), ascribed to Hegesippus, is confessedly spurious. The most complete collection of the fragments of his writings is that of Galland, *Bibliotheca*, vol. ii. (Venice, 1765-81); they are also in Migne, *Patrol. Græca*, v., and are translated in the *Ante-Nicene Fathers*, viii.

HEGESIPPUS. An Athenian orator of the fourth century B.C., an ally of Demosthenes against Philip of Macedon. The oration *De Haloneso*, ascribed to Demosthenes, probably is the work of Hegesippus.

HEGESO, hē-jē'sō, MONUMENT OF. One of the most beautiful of the monuments in the Street of Tombs, at Athens. It belongs to the fourth century B.C., and is decorated with a relief representing a lady at her toilet with a female slave in attendance.

HEGIRA, hĕj'ĭ-rȧ. See HEJIRA.

HE'GIUS, ALEXANDER (c.1433-98). A humanist, teacher of Erasmus. He was born at Heek (whence his name), in Westphalia, and was taught by Thomas à Kempis at Zwolle. In 1469 he taught at Wesel; in 1474 at Emmerich and at Deventer, where Erasmus, the future Pope Adrian VI., Conrad Goclenius, afterwards professor at Louvain, and Hermann von dem Busch were among his pupils. His methods were novel; he did not use the mediæval text-books, but made classic Latin his standard, and tried to introduce Greek. His works, comprising treatises on pedagogy, morals, and psychology, together with hymns, elegies, and letters, and an essay, *De Utilitate Græcæ Linguæ*, now very rare, were originally published by Jakob Fabri in 1503.

HEGNENBERG-DUX, hĕg'nen bĕrk dụx', FRIEDRICH ADAM JUSTUS, Count (1810-72). A Bavarian statesman, descended from Georg Dux, a natural son of William IV. of Bavaria. He was educated at Würzburg, and in 1845 was elected to the Bavarian Lower House. He was a member of the National Assembly at Frankfort, and from 1848 to 1865 was president of the Bavarian House of Deputies. Always independent in politics, he was a leader of the opposition up to 1848, then for a short time was allied with the Government, only to oppose it again. In 1871 he was made Prime Minister; but he died less than a year after.

HEGNER, hāg'nēr, ULRICH (1759-1840). A Swiss author, born at Winterthur. He wrote: *Auch ich war in Paris* (1803-4); *Berg-, Land- und Seereisen* (1818); *Die Molkenkur* (3d ed. 1827), a descriptive novel; its sequel, *Suschens Hochzeit* (1819); and *Salys Revolutionstage* (1814), an historical novel; also the biographical and critical works: *Hans Holbein, der jüngere* (1827), and *Beiträge zur nähern Kenntnis und wahren Darstellung J. K. Lavaters* (1836). His collected edition of his works was published at Berlin (1828-30). Consult: Schellenberg-Biedermann, *Erinnerungen an Ulrich Hegner* (Zurich, 1843), and Waser, *Ulrich Hegner* (Halle, 1901).

HEGO'LEH, or MADOQUA. See DUIKER.

HEHN, hān, VIKTOR (1813-90). A German-Russian writer and teacher, born at Dorpat. He studied there (1830-33) and at Berlin (1838-40). After extended travels, especially in Italy, he became teacher of German at Pernau (1841), and afterwards at Dorpat. Here he fell under suspicion politically, and, after a long consideration of his case, was by Czar Nicholas ordered to serve in an inferior position in the Province of Tula in the interior of Russia. But Alexander II. summoned him to Saint Petersburg and made him chief librarian of the Imperial library (1855). In 1860 and 1863 he traveled again in Italy, and from 1874 on lived at Berlin as Russian Imperial Councilor. His works are: *Zur Charakteristik der Römer* (1843); *Zur Physiognomie der italienischen Landschaft* (1844), *Italien: Ansichten und Streiflichter* (6th ed. 1900); *Kulturpflanzen und Haustiere in ihrem Uebergang von Asien nach Griechenland und Italien sowie in das übrige Europa* (7th ed. by O. Schrader, 1902), the most important of his works and the most important work on the subject; *Gedanken über Goethe* (4th ed. 1900); and, posthumously, *Hehns Briefe an seinen Freund Wichmann* (1890); *De Moribus Ruthenorum. Zur Charakteristik der russischen Volksseele. Tagebuchblätter, 1857-73* (1892, edited by Schiemann); *Ueber Goethes Hermann und Dorothea* (1898, edited by Leitzmann and Schiemann); and *Reisebilder aus Italien und Frankreich* (1894, edited by Schiemann). For his *Life*, consult Schrader

(Berlin, 1891), and Schiemann (Stuttgart, 1894).

HEIBERG, hī'bĕrk, Hermann (1840—). A German novelist, born in Schleswig, and educated there. He succeeded his father in his publishing house, sold it in 1870, and went to Berlin, where he was editor of the *Norddeutsche Allgemeine Zeitung* and of the *Spenersche Zeitung*, and, after a few years as a banker, devoted himself to literature. His novels are modern and realistic, dealing mostly with family life; among the nearly threescore titles the following may be mentioned: *Acht Novellen* (2d ed. 1895); *Apotheker Heinrich* (2d ed. 1890); *Eine vornehme Frau* (2d ed. 1889); *Esthers Ehe* (2d ed. 1890); *Menschen untereinander* (2d ed. 1896); *Höchste Liebe schweigt!* (2d ed. 1894); *Zwischen drei Feuern* (1895); *Merkur und Amor* (1898); *Vieles um Eine* (1900); *Dreissig Geschichten* (1901); *Zwei Frauen* (1901). Consult Merian, *Hermann Heiberg* (Leipzig, 1891).

HEIBERG, Johann Ludvig (1791-1860). A Danish poet and critic, born in Copenhagen. He was the son of Peter Andreas Heiberg, and of a famous novelist who later became Baroness Gyllembourg-Ehrensvärd (q.v.). The father was exiled in 1800, and the mother cared for the son till he entered the University of Copenhagen in 1809. He spent four years in study and travel, and in 1813 wrote at Stockholm "Hjemkomsten" (The Return Home), a poem of much strength. This was followed by a drama, *The Theatre for Marionettes* (1813), and other work that brought Heiberg after his graduation (1817) a grant from the Government for travel. He passed 1819-22 at Paris with his exiled father. For three years he was professor of Danish at Kiel, and lectured on the comparative merits of the Eddas and Oehlenschläger (German trans., 1827). In 1825 he returned to Copenhagen, endeavored vainly to propagate Hegel's metaphysics, and produced in rapid succession national dramas, comedies, vaudevilles, and farces, while editing the *Copenhagen Flying Post*, and writing also poems collected in 1841, two of which, "A Soul After Death," and "The Newly Wedded," are masterpieces. Much of all this work was satirical, and Heiberg grew increasingly unpopular, especially for a malicious dramatic skit, *The Nut-Cracker* (1845). Yet in spite of this he was made director of the National Theatre in 1849, a post from which he was forced by intrigue in 1856, after which he was made theatre censor. He died in Paris. Heiberg's *Works* are in twenty-two volumes (Copenhagen, 1861-62).

HEIBERG, Peter Andreas (1758-1841). A Danish writer, born at Vordingborg, on the island of Seeland. From 1788 he was active at Copenhagen as a translator, and, with Malte-Brun (q.v.), as an exponent of liberal ideas and a scathing critic of the Danish Government. In 1799 he was accused of a series of offenses against a newly enacted press law, and was banished the kingdom. He went to France, was there appointed by Napoleon to a post in the Ministry of Foreign Affairs, and obtained a pension from Louis XVIII. In his *Rigdalersedlens Hændelser* ("Adventures of a Bank-Note"), and more particularly in his operettas and comedies, he unsparingly satirized the existing régime for its obscurantist tendencies and its unfairness. As a dramatist he was perhaps second to Holberg (q.v.) in influence, but was greatly inferior to him in merit. One of his comedies appeared in an English rendering, by C. H. Wilson, as *Poverty and Wealth* (London, 1799). He further wrote political treatises in Danish and French. Consult the study by Schwanenflügel (Copenhagen, 1891); also Heiberg's own *Erindringer af min politiske og literaire Vandel i Frankrige* (Christiania, 1830), and Longfellow, *The Poets and Poetry of Europe* (New York and London, 1855).

HEIDEGGER, hī'dĕg-ĕr, Johann Heinrich (1633-98). A Swiss theologian, born at Bärentschweil, in the Canton of Zürich. He was a student at Marburg and Heidelberg, and afterwards returned to the latter town as professor of Hebrew and then of philosophy. In 1665 he was made professor of moral philosophy at Zürich. An ardent reformer and expert controvertist, he was the author, with Turretin, of the *Formula Consensus Helvetica* (1675), the object of which was to effect a league of the Reformed churches. This plan, however, failed. He was the author of a number of other works of little interest now, mostly directed against the Catholic Church, and including *Anatome Concilii Tridentini* (2 vols., 1672), and a *Historia Papatus* (1684), published under the pseudonym Nicander von Hohenegg.

HEIDELBERG, hī'dĕl-bĕrk. A city of Germany, formerly capital of the Palatinate, situated in the northern part of Baden, on the left bank of the Neckar, 12 miles southeast of Mannheim, and 55 miles south of Frankfort (Map: Germany, C 4). It is renowned for its romantic picturesqueness and historic environs. The old town lies on a beautiful slope between the castle hill and the river. It consists mainly of one street (Hauptstrasse) about one and a half miles long, and is architecturally very interesting. The newer portion of Heidelberg extends westward. The interesting Rathaus was built in 1704. Among the ecclesiastical edifices, the most prominent are the late-Gothic Heiliggeistkirche, of the fifteenth century, erected under the Emperor Rupert, whose tomb it holds, and the Protestant Church of Saint Peter, restored in the ornate Gothic style in 1867.

In addition to the famous university (q.v.), Heidelberg is celebrated for its castle, one of the most interesting in Europe, now to a great extent a ruin. It overlooks the town on the east and is surrounded by a splendid park. It was probably founded by Conrad of Hohenstaufen in the twelfth century, and was enlarged at various times by the rulers of the Palatinate, the palatial portions dating from the sixteenth century and the earlier part of the seventeenth. The castle was well-nigh destroyed in the desolating wars waged by Louis XIV. toward the close of the seventeenth century. It was largely rebuilt, then ruined by lightning in 1764 and left in its present condition. This ivy-clad, moated castle, reached by a bridge, and rising with careless grandeur in the midst of beautiful trees and foliage, consists of a number of buildings constructed at different periods. The yard is faced by the highly decorated façades of the castle's two finest buildings—the Friedrichs-Bau and the Otto-Heinrichs-Bau. The former is a grandiose, late-Renaissance building, dating from 1601. The latter, dating from 1556, with a striking portal,

is a rare example of German Renaissance, its front being lavishly covered with medallions, and with symbolical statues, both biblical and pagan. There are vast princely halls, the great watch tower, a beautiful balcony, dungeons, cellars, one containing the well-known Heidelberg tun (q.v.), the museum with pictures and historic relics, and a magnificent terrace which commands a splendid view. On the terrace is a statue of Victor von Scheffel, unveiled in 1891.

The environs of Heidelberg abound in ancient, often prehistoric ruins, foundations, ring-walls, and cisterns, and are rich in legendary and literary associations, and romantic haunts of the feudal nobility. Among the conspicuous objects of interest are the Molkencur, a lovely hill whose top commands a view of the castle from above; the Heiligenberg, the Mons Piri of the Romans; the old and new bridges over the Neckar; the Philosophenweg, a long, charming walk through vine-clad slopes, with views reaching to the distant Speyer Cathedral and the Hardt Mountains; and the famous students' inn and dueling-grounds in the vale of the Hirschgasse.

The educational institutions of Heidelberg comprise, besides the university, one gymnasium, an 'oberreal,' and an industrial school, and several private schools. There are also a museum and a number of scientific and art societies. The manufactured products include cement, artificial wood, scientific instruments, fire-department apparatus, etc. There is considerable trade in the hops, tobacco, fruits, and nuts grown in the vicinity. The town is equipped with electric railways. The population was 31,739 in 1890, and 40,121 in 1900, including 14,194 Protestants. The number of foreign residents, many of whom are English and American students in the university, is about 1000.

Heidelberg stands on the site of a Roman colony, but the town dates only from the latter part of the Middle Ages. From the thirteenth century, when it was an insignificant place, down to 1720 it was the capital of the Palatinate. After the Reformation Heidelberg was long the headquarters of German Calvinism, and gave its name to a famous Calvinistic catechism. The town suffered much during the Thirty Years' War. Tilly captured and plundered it in 1622. It was severely treated by the French in 1688, and was in 1693 almost totally destroyed by them. It passed to Baden in 1803. Consult: Hautz, *Geschichte der Universität Heidelberg* (Mannheim, 1862-64); Oncken, *Stadt, Schloss und Hochschule Heidelbergs* (Heidelberg, 1885).

HEIDELBERG, University of. The oldest of the German universities within the present German Empire, founded in 1386 by Rupert I., Elector Palatine. The first rector and the real organizer was Marsilius von Inghen, who modeled the university after that in Paris, where he had been a lecturer. The organization was ecclesiastical, the mode of teaching scholastic. From the beginning the university was well attended and successful. In the middle of the sixteenth century Melanchthon gave his aid to a complete reorganization; scholasticism gave way to humanism, and from being Catholic the university became Protestant and a stronghold of Calvinism. At this time the staff included Ursinus and Olevianus, the authors of the Heidelberg Catechism, published in 1563. A period of great prosperity followed, lasting till 1622, when Tilly captured the town and sent to Rome the famous collection of manuscripts known as the Bibliotheca Palatina. The university was much crippled, and in 1626 suspended altogether. In 1652 it was restored, with freedom of confession for all teachers. In the French wars at the end of the century, however, the town again suffered, and the university was again broken up. Some of the professors, it is true, set up instruction at Frankfort-on-the-Main in 1694, removed to Weinheim in 1698, and two years later returned to Heidelberg once more; yet for a century the university led a dead-and-alive existence under the influence of Catholic reactionaries, and after the Peace of Lunéville (1801) nearly all its possessions and endowments were lost. When Heidelberg became a part of Baden in 1803, its new sovereign restored the foundation, and it has since in a measure recovered its former fame. In 1886 the five-hundredth anniversary was celebrated. There were 1600 students in 1901, the largest number in any one faculty being in jurisprudence. The library has about 400,000 volumes, including incunabula, and 3500 manuscripts. Consult Hautz, *Geschichte der Universität Heidelberg* (Mannheim, 1862-64).

HEIDELBERG CATECHISM. See Catechism.

HEIDELBERG TUN. An enormous wooden cask in the cellar beneath Heidelberg Castle, set up in 1751 by the Elector Charles Philip. It has a capacity of 49,000 gallons, and measures 36 × 24 feet. Until 1769 it was constantly kept full of Rhine wine, but the custom was abandoned in that year.

HEIDELBERG UNIVERSITY. An educational institution situated at Tiffin, Ohio. It was incorporated as a college in 1851 and reorganized as Heidelberg University in 1890. Its endowment in 1902 was $125,000, its income $15,000, and the approximate value of its buildings and grounds $150,000. In the same year its faculty numbered 30, and its student body 350, of whom 100 were enrolled in the collegiate department. Its departments include summer and preparatory schools, and schools of music, art, oratory, commerce, and theology. The library contains about 25,000 volumes.

HEIDELOFF, hī'de-lōf, Karl Alexander von (1788-1865). A German architect and painter, born at Stuttgart. He studied in Stuttgart and was called to Nuremberg as municipal architect (1818). His knowledge of the early Gothic made him particularly successful in restorations; examples of this are the churches of Saint Sebald and Saint Laurent, and Albert Dürer's fountain. He was made professor in the polytechnic school, and conservator of the monuments of art in Nuremberg. He was an historical painter of some note, and the author of several important works on architecture, among which are: *Die Lehre von den Saulenordnungen* (1827); *Der Kleine Vignola* (1832); *Nurnbergs Baudenkmale der Vorzeit* (1838-54); *Die Ornamentik des Mittelalters* (1838-42); *Die Kunst des Mittelalters in Schwaben*; and *Baudenkmale aus Schwaben* (1854-61).

HEIDEN, hī'den, Eduard (1835-88). A German agricultural chemist, born and educated at Greifswald. He went to Eldena in 1855 and became assistant in the chemical laboratory there

(1857). He was professor of agricultural chemistry at Waldau (1862-67) and at Berlin; and, in 1868, was appointed to the superintendency of the experimental station at Pommritz. He wrote: *Die Phosphorsäure* (1864); *Lehrbuch der Düngerlehre* (2d ed. 1879-87); *Die landwirtschaftlichen Versuchsstationen* (2d ed. 1874); *Leitfaden der gesamten Düngerlehre und Statik des Landbaues* (3d ed. 1892); *Ueber die zweckmässigste Ernährung des Schweins* (1879); and, with Müller and Langsdorff, *Die Verwertung der städtischen Fäkalien* (1885).

HEIDENHAIN, hī'den-hīn, Rudolf Peter Heinrich (1834-97). A German physiologist, born at Marienwerder, and educated at Königsberg, Halle, and Berlin. He spent several years in experimental research with Du Bois-Reymond, and became docent at Halle (1857) and professor at Breslau (1859). Besides many contributions to the foremost German technical journals of histology, anatomy, and physiology, he published: *Physiologische Studien* (1856); *Mechanische Leistung, Wärmeentwicklung und Stoffumsatz bei der Muskelthätigkeit* (1864); *Der sogenannte tierische Magnetismus* (1880); *Die Vivisektion im Dienste der Heilkunde* (1879); *Die Vivisektion* (1884); and *Beiträge zur Histologie und Physiologie der Dünndarmschleimhaut* (1888). Consult Grützner, *Zum Andenken an Rudolf Heidenhain* (Bonn, 1899).

HEIDENHEIM, hī'den-hīm. A town of Württemberg, Germany, situated on the Brenz, a short distance from the Bavarian frontier (Map: Germany, D 4). It has a number of large manufacturing establishments, including cotton-mills, machine-shops, cigar-factories, chemical-works, etc. Population, in 1900, 10,510.

HEIDENMAUER, hī'den-mou'ĕr (Ger., heathen wall). (1) A name given in Germany to the remains of various prehistoric fortifications of German and Roman origin. Such ramparts are found on the Ottilienberg, a hill of the Vosges in Lower Alsace, and on the Kastanienberg near Dürkheim, in the Palatinate. (2) A novel by James Fenimore Cooper (1832). The scene is laid in the Vosges during the Middle Ages.

HEIDENSTAM, hī'den-stâm, Werner von (1859—). A Swedish littérateur, born at Olshammar (Nerike Province). He studied painting at the Stockholm Academy, but later turned to literature; took prominent rank among contemporary Swedish verse-writers by his collections, *Vallfahrt och Vandringsår* (1888) and *Dikter* (1895), and wrote further, among various works, the volumes of prose sketches, *Från Col di Tenda till Bloxberg* (1888) and *Saint Göran och draken* (1900; in a German rendering, 1902). His poetical work is original in content, but unequal and often crude in technical structure.

HEIGEL, hī'gel, Karl August von (1835—). A German poet, born in Munich, and educated at the university there. In 1863 he went to Berlin, and from 1865 to 1875 was editor of the *Bazar*. From 1875 on he lived a wandering life in Munich, the Tyrol, and Italy, occupying himself with literary work under the patronage of Louis II. of Bavaria. After the death of the King, Heigel lived at Riva, on Lake Garda. His principal works are: The dramas, *Marfa; Vor hundert Jahren; Freunde; Die Zarin; Die Heimkehr;* the novels, *Die schöne Zarin; Josephine Bonaparte;* the epic, *Bar Cochba, der letzte Judenkönig* (1857); the stories, *Ohne Gewissen* (1871); *Die Dame ohne Herz* (1873); *Benedictus* (1875); *Das ewige Licht* (1877); *Es regnet* (1878); *Der Karneval in Venedig* (1878); *Mosaik* (1886); *Das Geheimnis des Königs* (1891); *Der reine Thor* (1891); *Der Roman einer Stadt* (1893); *Gluck-Gluck* (1894); *Der Herr Stationschef* (1897); *Am blauen Gardasee* (1898); *Der Mahradscha* (1900); *Die neuen Heiligen* (1900); and the biographies, *Karl Stieler* (1890) and *König Ludwig II. von Bayern* (1892).

HEIGEL, Karl Theodor von (1842—). A German historian, brother of Karl August von Heigel. He was educated at Munich, his native city; became docent of history (1873), member of the Academy (1876), professor extraordinary in the university (1879), full professor (1883) in the polytechnic institute, and in 1885 professor and director of the historical seminary in the university. His works include: *Das Herzogtum Bayern, zur Zeit Heinrichs des Löwen und Ottos von Wittelsbach* (with Riezler, 1867); *Ludwig I. König von Bayern* (1872); *Der österreichische Erbfolgestreit* (1877); *Quellen und Abhandlungen zur neuern Geschichte Bayerns* (1890); *Nymphenburg* (1891); and *Deutsche Geschichte vom Tode Friedrichs des Grossen bis zur Auflösung des alten Reichs* (1892—). With H. Grauert he became editor of *Historische Abhandlungen* (Munich, 1891 et seq.).

HEIGHTS, Measurement of. See Leveling; Hypsometry.

HEIJN, hīn, or **HEYN,** Piet (1578-1629). A Dutch admiral. He was born at Delftshaven near Rotterdam. In 1626 he engaged and utterly defeated the Portuguese in All Saints Bay, Brazil, and returned to Holland with an immense booty. Only two years after this he captured, in the Bay of Matanzas, almost without a blow, the grand Spanish silver flotilla, the value of which was estimated at 12,000,000 Dutch guilders. As a reward he was named admiral of Holland, in 1629. Shortly after, he met his death in a naval encounter off Dunkirk.

HEILBRONN, hīl-brŏn'. A manufacturing town of Württemberg, Germany, situated on the Neckar (here navigable), 33 miles by rail northeast of Stuttgart (Map: Germany, C 4). The old section of Heilbronn is surrounded by a fine avenue laid out on the site of the ancient fortifications. In this part are the interesting Gothic Church of Saint Kilian, begun in the eleventh century, and recently restored, with a rich carved altar; the late Gothic Rathaus of the sixteenth century, with a remarkable clock, and associated intimately with the history of Götz von Berlichingen, as is also the Götzenturm where he was imprisoned, a remnant of the old fortifications; the administration building, originally an Imperial palace and afterwards occupied by the Teutonic Order; and the Schönthaler Hof where Charles V. once sojourned for the sake of the Heilbronn waters. Schiller lived in Heilbronn for a time, and his house is shown. There are an historical museum, a theatre, interesting archives (among which are letters from Gustavus Adolphus, Charles XII., Schiller, and others), a gymnasium founded at the beginning of the seventeenth century, a splendid post-office, schools of music and of agriculture, and a meteorological observatory. The

town is lighted by gas, supplied by a municipal plant, and by electricity.

Industrially it is of great importance. It produces chemicals, silver articles, machinery, sugar, cigars, soda, chicory, coffee, etc. In the vicinity are situated extensive salt works and numerous vineyards. The town has four harbors and a large trade in groceries, agricultural products, wood and coal. The magnificent views in the vicinity embrace the mountains of Middle Germany, the Black Forest, and the Vosges. Heilbronn is of considerable antiquity. After an existence of some 500 years it became a town in 1225 and a free city in 1360. It suffered greatly from war through the Middle Ages. Here, in 1633, in the course of the Thirty Years' War, a treaty of alliance was concluded between the German Protestant States and Sweden. Heilbronn came into the possession of Württemberg in 1802. Population, in 1890, 29,939; in 1900, 37,891, mostly Protestants.

HEILBUTH, hīl'boot, Ferdinand (1826-89). A genre painter born at Hamburg, but naturalized as a Frenchman. He traveled and studied in Italy, and finally settled in Paris. His pictures are charming in color and full of humor and grace. Among them may be mentioned the following: "Palestrina's Rehearsal" (1857); "Luca Signorelli by the Body of His Slain Son" (1859), in the Hamburg Gallery; "Mont de Piété" (1861), in the Luxembourg; and "On Monte Pincio," in the Corcoran Gallery, Washington, D. C. He also painted some excellent portraits. He received second-class medals at the Salons of 1857, 1859, and 1861, and the Legion of Honor in 1881.

HEIL DIR IM SIEGERKRANZ, hīl dēr īm zē'gēr-kränts (Ger., Hail to thee with victor's crown). The Prussian national hymn, the original words for which were written by Heinrich Harries. They were published in the *Flensburger Wochenblatt* of January 27, 1790, as "A Song for the Danish Subject to sing on his King's Birthday" to the melody of the English national hymn, "God Save Great George, the King." In 1793 B. G. Schumacher published a revised version in five stanzas which soon became the national hymn.

HEILPRIN, hīl'prĭn, Angelo (1853—). An American naturalist and traveler, son of Michael Heilprin. He was born in Hungary, and came to the United States in 1856. In 1876-78 he prosecuted his studies at the Royal School of Mines, London, at Geneva, and at the Imperial Geological Institution of Vienna. He was professor of invertebrate palæontology and geology at the Academy of Natural Sciences, Philadelphia (1884-1900), executive curator of that institution from 1883 to 1892, and the first president of the Geographical Society of Philadelphia. In 1886 he made a journey to Florida and determined the geological structure of the peninsula. In 1888 he investigated the structure of the Bermuda Islands, and in 1890 made a journey to Mexico which yielded valuable results in connection with the geology of the great central plateau, and in the course of which he ascended Orizaba, Popocatepetl, and Iztaccihuatl, making new barometric measurements of their altitude. In 1892 Professor Heilprin led the Peary Relief Expedition to Greenland. After the destruction of Saint-Pierre, Martinique, by the eruption of Mont Pelée, in 1902, he made two journeys to the island, and repeatedly climbed to the crater while the volcano was in eruption. Among his publications are: *Contributions to the Tertiary Geology and Palæontology of the United States* (1884); *The Geographical and Geological Distribution of Animals* (1887); *The Geological Evidences of Evolution* (1888); *The Bermuda Islands* (1889); *Principles of Geology* (1890); *The Arctic Problem* (1893); *The Earth and Its Story* (1896); *Alaska and the Klondike* (1899); *Mont Pelée and the Tragedy of Martinique* (1902).

HEILPRIN, Louis (1851—). An American scholar and encyclopædist, brother of Angelo Heilprin. He was born in Hungary. He became connected with various American encyclopædic publications, including the *New International Encyclopædia*, and is the author of the *Historical Reference Book* (1884; 6th ed. 1899).

HEILPRIN, Michael (1823-88). A biblical scholar, critic, and writer. He was born at Piotrkow, Russian Poland, of Jewish parents. He belonged to a family whose members were distinguished in the field of Hebrew lore as far back as the sixteenth century. His father, Phineas Mendel Heilprin, a Hebrew scholar of note, left Poland with his family in 1842, in consequence of the oppressive measures of the Russian Government, and settled in Hungary. On the outbreak of the Hungarian Revolution of 1848, Michael Heilprin threw himself ardently into the movement for national independence headed by Kossuth, whose friend he became. He published stirring war songs in the Magyar language, of which he had made himself master, and was appointed secretary of the literary bureau attached to the Ministry of the Interior under Szemere. After the collapse of the Revolution, Heilprin lived for a short time in exile, and in 1856 he settled in the United States. He was connected with the *New American Cyclopædia* from 1858, and was one of the associate editors of the new edition of that publication (1873-76). On the establishment of the New York *Nation* in 1865, he became one of the regular contributors, his articles embracing a wide range in current European history and literary criticism. In 1879 he published the first volume of *The Historical Poetry of the Ancient Hebrews, Translated and Critically Examined*, a work of profound original research, which at once took a position both in America and Europe as a most valuable contribution to advanced biblical criticism. The second volume appeared in 1880, the work being left incomplete at the author's death. Heilprin devoted the last years of his life in great measure to furthering Russian-Jewish agricultural colonization in the United States. He was a scholar of encyclopædic knowledge, and was familiar with more than a dozen languages.

HEILSBRONN, hīls'brŏn. A small town in the Bavarian circle of Middle Franconia, situated 20 miles from Nuremberg. The Cistercian Abbey of Heilsbronn, the burial place of the Hohenzollern burgraves of Nuremberg, of the first Hohenzollern Electors of Brandenburg, and of a number of Franconian princes of the house, owed its origin in 1132 to Bishop Otho of Bamberg. The church contains monuments commemorative of ancient German history, and illustrative of the progress of art in Germany during the Middle Ages. Population, in 1900, 1208.

HEIM, hīm, ALBERT (1849—). A Swiss geologist, born at Zurich, where he was educated, and after further study at Berlin, was made docent, and, in 1873, professor in the Polytechnic Institute. In 1875 he became also professor in the university. In 1881 he was appointed director of the department of natural sciences in the Polytechnic and head of the geological museum. He traveled to New Zealand in 1901. Heim wrote: *Untersuchungen über den Mechanismus der Gebirgsbildung* (1878); *Handbuch der Gletscherkunde* (1885); *Beiträge zur geologischen Karte der Schweiz* (1890); *Geologische Excursion quer durch die östlichen Schweizer Alpen* (1894). He also published a *Geologische Karte der Schweiz* (1894, with Schmidt), as well as several panoramic views and reliefs of Switzerland.

HEIM, äN, FRANÇOIS JOSEPH (1787-1865). A French historical painter, born at Belfort. He studied under Vincent and won the Prix de Rome in 1807. His classic style was unsympathetic to the art world, newly converted to romanticism, and it was not until the end of his career that he gained the recognition he deserved. In the Louvre there are several large historical subjects by him, such as "Charles X. distribuant les récompenses aux artistes à la fin de l'Exposition de 1824" ("Charles X. Distributing Prizes at the Salon of 1824"), and "La brise du temple de Jérusalem" ("Taking the Temple of Jerusalem"). He also painted a number of portraits and executed some decorative works for the Hall of Conference in the Chamber of Deputies, and two ceilings in the Louvre. He received a first-class medal at the Salon of 1812, and the medal of honor at the Paris Exposition of 1855, and became a member of the Institute in 1829, and an officer of the Legion of Honor in 1855.

HEIM, hīm, or **HEIMR**, hīmr (Icel. *home*). In Norse mythology nine worlds are named: Muspelheim, Asaheim, Ljosalfaheim, Vanaheim, Mannaheim, Jötunheim, Svartalfaheim, Helheim, and Niflheim. The highest is Muspelheim (world of fire) the home of Surt, in the highest region of which was Gime (heaven). The lowest is Niflheim (mist-world), the home of cold and darkness, having in its midst the fountain Hvergelmer, where the dragon Nidhogg dwells. Midway between Muspelheim and Niflheim is Mannaheim (man's world), the round plane of the earth surrounded by the ocean. Above Mannaheim is Asaheim (world of the gods), forming an immense vault above the earth. In the midst of this is Idavold, the place where the gods assemble. Beyond the ocean is Jötunheim (home of giants), separated from Asaheim by the river Ifing, which never freezes over. Next above the earth is Ljosalfaheim (home of the elves of light), and between it and Asaheim is Vanaheim (home of the vans). Farther down is Svartalfaheim (world of dark elves); further still Mannaheim, and lastly Helheim (world of the dead, or *hel*).

HEIMBURG, hīm'bûrk, GREGOR VON (c.1400-72). A German jurist and diplomat, born at Würzburg. About 1430 he became secretary to Æneas Silvius, afterwards Pope Pius II., and accompanied him to the Council of Basel; but they soon quarreled because of Heimburg's opposition to the Papal policy of interference in German affairs, and the young man became syndic of Nuremberg, and took a great part in the declaration of the neutrality of the German Church in the quarrel between the Council and Pope Eugene IV. (1438). He was a member of the commission demanding from the Pope the reinstatement of the electors of Cologne, Mainz, and Treves (1446); and as minister of Duke Sigismund of Austria opposed the Pope and was put under the ban. Eventually Sigismund made his peace with the Pope and Heimburg left his service for that of the Hussite King, George Podiebrad, of Bohemia. The latter died in 1471 and his Minister went to the court of the Duke of Saxony, where he died in the following year, only a few months after Pope Sixtus IV. had removed the excommunication against him. His collected works, showing well the polemic character of the man, were published at Frankfort in 1608. Consult: Pfizer's poem, *Der Welsche und der Deutsche* (Stuttgart, 1844); Brockhaus, *Gregor von Heimburg* (Leipzig, 1861); and Joachimson, *Gregor von Heimburg* (Munich, 1889).

HEIMBURG, WILHELMINIE. See BEHRENS, BERTHA.

HEIMDAL, hīm'dâl, or **HEIMDALER**, hīm'dâ-lēr (Icel., world-bow). In Norse mythology, a son of Odin, whose mother was of the Jötun race, often said to be the son of nine virgin sisters. He is the guardian of Asgard, for which position he is peculiarly fitted; for he can see as well by night as by day, requires as little sleep as the birds, and can hear the grass grow. Before the last conflict he will rouse the gods by blowing on his horn jallarhorn. According to a later myth he is regarded as the god of the rainbow.

HEIMSKRINGLA, hīms'krīng'lâ (Icel., world-circle). One of the most important works in early Norse literature, being a history of the Norse Kings from the earliest times, by Snorri Sturluson (q.v.).

HEINE, hī'ne, HEINRICH (1797-1856). The greatest lyric poet of modern Germany, born in Düsseldorf, December 13, 1797 (some authorities, 1799). He was called by himself the last of the Romanticists, and by Matthew Arnold the continuator of Goethe, and was the only writer of primary importance in German literature since Goethe's death. "Your grandfather," he says he was told, "was a little Jew, and had a big beard." He had shrewd sons, for all of them won a competence, and Heine's uncle Salomon became one of the wealthiest bankers of Hamburg. His father had but small part in his life. His mother (named von Geldern), to whom he showed a constant devotion till his death, gave to his fantastic and romantic nature a joy of life and a spirit of naturalism that make him akin to Goethe. He was a precocious boy, educated in a desultory way by Roman Catholic monks and French 'philosophes,' with the result that he became a skeptic before he had any faith to lose. He seems to have suffered little from race prejudice in youth, and for that he was grateful to France and to Napoleon, for whom he retained a kind of hero-worship, and so had little sympathy with the War of Liberation (1813-14), that "contracted the heart so that men learned to hate what was foreign and in ceasing to be citizens of the world became only narrowly German." No reproach belongs to him

that he found small inspiration to patriotism in the thirty years that followed Waterloo.

While preparing himself to become a merchant and learning English, French, and Italian, he began to write poetry under the inspiration of a child-love for 'Veronica,' probably also the 'Reseda' of early poems. He conceived a passing affection, too, for an executioner's daughter, Josepha, the subject of several poems, of his "Dream Pictures," and of the most exquisite passage in his memoirs. She was, he says, his 'love's purgatory' before he fell into love's hell in his unrequited affection for his cousin Amalie at Hamburg, whither he went in 1816. He tried to set up a business there in 1818, but he liked neither the business nor the city. For Amalie, under the names Ottilie, Maria, Clara, Evelina, Agnes, Juliana, he voiced his passion in many beautiful songs, and it has since been made the subject of two novels, Zianirtza's *Heinrich Heine der Liederdichter* (1864), and Dietz's *Heinrich Heines erste Liebe* (1870). He failed in business, and at the expense of his uncle and Amalie's father, who aided him generously through life, he went in 1819 to study law at Bonn, where he came under the influence of A. W. Schlegel, and the Romantic School, in so far as it stood for the reawakening of the poetic spirit of the Middle Ages. He shared with them also a gift of irony, though in him this sprang from the incompatibility of two elements in his nature, a Greek joy of life inherited from his mother, and fostered by the influence of Goethe, and a congenital Hebrew earnestness. There was never harmony between these antinomies of his character, and from their jarring came a mocking spirit that he possessed in higher degree than any writer of the century. At Bonn under this new influence Heine wrote more lyrics and had begun a tragedy, *Almansor*, when he left Bonn for Göttingen, and being soon suspended from the university there for participation in a frustrated duel he went to Berlin, where he came under the philosophic influence of Hegel and associated with Grabbe, Immermann, Willibald Alexis, Gans, Moser, Zunz, Chamisso, Fouqué, and particularly with Varnhagen and his Rahel, who led him to a juster appreciation of Goethe, though he never became one of his unqualified admirers.

In Berlin, Heine's genius found warm appreciation. He essayed journalism, and in 1822 published a volume of poems (*Gedichte*), which for delicacy, fancy, conciseness, originality, and depth of lyric expression had no equal in Germany. A second volume (1823) contained the *Lyrisches Intermezzo*, which served to carry off two tragedies, *Almansor* and *Ratcliff*, his sole dramatic efforts. The *Intermezzo* is more bitter, reckless, sensual, than the *Poems*, but contains some of his most perfect lyrics. At home, Heine tells us, his mother read it and did not like it; his sister tolerated it; his brothers did not understand it, and his father did not read it at all. In 1823 a visit to the North Sea inspired *Heimkehr*, which with the later North Sea cycle (*Nordsee*) are Germany's best poems of the sea, worthy to rank with the best of Byron or Shelley. The year 1824 brought him to Göttingen again, and in June, 1825, he submitted to baptism that he might obtain an advocate's license. "I assure you," he writes to a friend, "if the law had allowed stealing silver spoons instead, I should not have been baptized." This dishonor, forced on him by the State, makes a melancholy close to a brilliant university career. During the second stay at Göttingen Heine made the tour of the Harz Mountains and wrote the *Harzreise* (1826), the best known of his prose works. After taking his degree he revisited the North Sea and wrote *Norderney*, incorporated with the *Harzreise* in the *Reisebilder* (Pictures of Travel), which later embraced also *Das Buch Le Grand* and *Die Bäder von Lucca*. Such light, easy, sparkling prose, such graceful, daring, bubbling wit, had never yet been known in Germany, and the *Reisebilder* remains an unapproached model. Heine in this field has never been equaled save by himself, and he has not always maintained the level of the *Harzreise*. The *Buch Le Grand*, written in 1826, was revolutionary in tendency and in its admiration for Napoleon. Heine thought it safer to abide its publication in England (1827). It was enthusiastically received and generally prohibited by the police. It was graceful, grotesque, cynical, naïve; it had a brilliancy, a vigor, a keenness of scorn, a fire of enthusiasm that have seldom been surpassed. Heine made but a short stay in England, which was not congenial to him. He said, "The ocean would have swallowed it long ago if he had not been afraid it would make him seasick." He admired, however, the liberty of England. In September, 1827, he was again in Hamburg, seeing through the press his collected lyrics, the now famous *Buch der Lieder*. Thence he went to Munich, tried journalism, hoped in vain for a Government post, and in July, 1828, went disappointed to Italy, a journey that he describes after his manner in *Die Bäder von Lucca*—brilliant, witty, entertaining, immoral, coarse, revolutionary, and atheistic. After this Prussia was closed to him; influential men had been made his mortal enemies wantonly, and in the case of the poet Platen Heine's enmity assumed an utterly indefensible shape. Having been recalled to Hamburg by his father's death, Heine went in 1829 to Helgoland, where he gave himself up for two months to the fascination of the sea. He returned to his family in Hamburg famous throughout Germany as the author of the *Reisebilder*, the third volume of which appeared early in 1830, but as much feared as admired, and fiercely attacked on the part of those whom his reckless satire had wounded. Prussia, where the government had prohibited the circulation of the third volume of the *Reisebilder*, was now closed to him, and the thought of a professorship, which he had long cherished, had to be abandoned. He turned his thoughts to Paris. The news of the French Revolution of 1830 reached him in Helgoland, where he spent the summer of that year, and filled him with enthusiasm. May, 1831, saw Heine in Paris, which remained his home till death.

Heine's first years in Paris were busied with journalism and dreary feuds with German Liberals. He soon found himself at home in the French capital, and enjoyed the society of Madame Récamier, Balzac, Dumas, George Sand, Béranger, Thiers, Chopin, Liszt, Berlioz, and many lesser celebrities. He considered it his mission to draw Germany and France closer together, and wrote a series of papers on French conditions for the Augsburg *Allgemeine Zeitung*, which

he republished in French. But not a few of his letters to the German press, even his art critiques, fell under the censor's pencil. In 1833, however, his acute critical study, *Die romantische Schule,* established his fame in France and opened to him the great *Revue des Deux Mondes,* in which he printed his *History of Religion and Philosophy in Germany since Luther,* a work of brilliant suggestiveness, which afterwards appeared in Heine's own German version as *Zur Geschichte der Religion und Philosophie in Deutschland.* The satiric *Memoiren des Herrn von Schnabelewopski,* half autobiographic, belong to this time. The scandal caused by his irregular life was checked by his "conscience-marriage" with Mathilde Mirat (1834). They were legally married in 1841, and remained closely attached till the poet's death. He had provided for her and she lived till 1883. Financial embarrassments now led Heine to seek a pension from the French Government. Though he had always criticised his patrons freely, the fact was bitterly remembered against him when it became known in 1848. From 1834 to 1842 his literary work is comparatively unimportant. A fragment of a novel, *Florentinische Nächte,* an essay on German mythology, and a slanderous attack on his fellow exile and journalistic critic Börne, may be merely mentioned. But in 1842 he wrote *Atta Troll* (Hamburg, 1847), a brilliant poetic satire on German politicians and on the Romantic School, and in 1843 a brief visit to Germany evoked *Neue Gedichte* and *Deutschland, ein Wintermärchen* (1844) keenly satiric, which became immensely popular. Disease now laid an unrelaxing hand on him. His eyes were affected, then his vocal cords, then his spine. The death of his patron, Salomon Heine, and the disgraceful meanness of his heir added to his sufferings. But these years of patiently borne sufferings show Heine in a nobler light than any in which he had yet appeared. In sleepless nights he composed wonderful songs on his 'mattress-grave.' His legs were paralyzed; to see he was obliged to hold up an eyelid with an emaciated finger; his hearing was weak. It was, he said, "a grave without rest, death without the privileges of the departed." But it brought a deeper, almost a spiritual earnestness into his life. He "returned to God like a Prodigal Son, after tending swine with the Hegelians." In this mood he wrote the poems of *Romancero* (1851), so tender, so melodious, so exquisite in fancy, that it seems almost past belief that they should have been the product of the sleepless nights of a bedridden sufferer; humorous pieces, like "The White Elephant," fierce political songs, like "The Weaver's Marseillaise," and the weird "Lazarus Cycle," written under the very shadow of death. Never had Heine been so many-sided as now. He continued to work as long as he could hear and speak. Many friends cheered him, among them, as poems testify, the talented Camille Selden and his 'little fairy,' the motherly Caroline Jaubert. Two miscellaneous volumes, headed by *Geständnisse,* appeared in 1854. His *Memoirs,* of which some parts have been published, occupied him to the eve of his death. His last words were, "Paper and pencil." He died February 17, 1856, and was buried in Montmartre Cemetery, without religious service.

Heine was essentially a realist, a revolutionary reformer, but never a blinded partisan. He speaks for a restless, questioning, dissatisfied age that has lost for the moment its ethical moorings. He is the most delicate and graceful song-writer and incomparably the wittiest, clearest, and keenest satirist of Germany, and so he is read with delight by an introspective and critical generation.

Heine's *Works* appeared in twenty-one volumes (1861-63) and in twenty volumes (1865). They have been often reëdited. Translations of the *Poems* by E. A. Bowring are in Bohn's library. There is an American translation of the *Pictures of Travel* and a version of the *Works* (incomplete) by Leland. *Wit, Wisdom, and Pathos of Heinrich Heine,* by J. Snodgrass (London, 1888), is a collection of excerpts. The best English critique of Heine is in Matthew Arnold's *Essays.* There is an English *Life, Work, and Opinions of Heinrich Heine,* by Stigand (London, 1876). The most complete German biography is by Strodtmann (3d ed., Berlin, 1884). Consult also those by Prölss (Stuttgart, 1886); Karpeles (Berlin, 1888); also his *Heine. Aus seinem Leben und aus seiner Zeit* (Leipzig, 1899). Keiter (Cologne, 1891), besides Brandes, *Das junge Deutschland* (Leipzig, 1890), and id., *Die Litteratur des 19. Jahrhunderts,* vol. vi. (ib., 1891); Zetz, *Heine in Frankreich* (Zurich, 1895); Mietzki, *Heinrich Heine als Dichter und Mensch* (Berlin, 1895); Nassen, *Heinrich Heines Familienleben* (Fulda, 1895); Kaufmann, *Heines Liebesleben* (Zurich, 1898); id., *Heines Charakter* (ib., 1901); Steinmann, *Heinrich Heine; Denkwürdigkeiten und Erlebnisse aus meinem Zusammenleben mit ihm* (Prague, 1757); Hüffer, *Aus dem Leben Heinrich Heines* (Berlin, 1878); Franzos, *Heines Geburtstag* (Berlin, 1900).

HEINECCIUS, hī-nĕk'tsī-ụs, JOHANN GOTTLIEB (1681-1741). A learned jurist of Germany, born at Eisenberg. He studied theology at Leipzig, and law at Halle, where, in 1713, he was made professor of philosophy, and in 1720 professor of law. In the latter capacity he went, in 1723, to Franeker, and in 1727 to Frankfort-on-the-Oder; but in 1733 returned, as professor of law and philosophy, to Halle, where he died August 31, 1741. His works display a thorough acquaintance with all departments of jurisprudence, but especially with Roman and German law; and their varied learning, logical arrangement, and elegant Latin, long maintained for them a classical character. His *Antiquitatum Jus Romanum Illustrantium Syntagma* was reëdited as recently as 1841 by Mühlenbruch, and his *Elementa Juris Civilis secundum Ordinem Institutionum* (edited by Biener, 1815); his *Elementa Juris secundum Ordinem Pandectarum,* etc., are still studied by jurists.—Heineccius's son, JOHANN CHRISTIAN GOTTLIEB HEINECCIUS, born 1718, at Halle, died 1791 at Sagan, was for a long time professor in the academy for young noblemen at Liegnitz, and edited, besides several of his father's works separately, a complete collection of them (*H. Opera Omnia,* 9 vols., Geneva, 1771), and wrote an account of his father's life and work, *Commentarius de Vita et Scriptis J. G. Heineccii.*—Heineccius's brother, JOHANN MICHAEL HEINECCIUS, born at Eisenberg, 1674, died September 11, 1722, was a celebrated pulpit orator in Halle, and also the first who studied seals scientifically. His theological writings are forgotten, but he is remembered by his *De Veteribus Germanorum aliar-*

umque Nationum Sigillis (Leipzig, 1710; 2d ed. 1719), and by the work edited in conjunction with Leuckfeld, *Scriptores Rerum Germanicarum* (Frankfort, 1707).

HEINITZ, hī'nits, Friedrich Anton, Baron (1725-1802). A Prussian statesman, born at Dröschkau, near Torgau. He studied mining and smelting at Kösen, Dresden, and Freiberg, filled several government positions, and planned the Freiberg Academy of Mines. He also took great interest in forestry and in road-building. In 1777 he left the Saxon for the Prussian service on his appointment as head of the Departments of Mining and Smelting, and in this capacity did much to develop the iron and coal industries. He published: *Mémoire sur ma gestion des 4e et 5e départements* (1788), a defense of his administration of the Bureau of Commerce and Manufacture; and anonymously, *Essai d'économie politique* (1785), and *Mémoire sur les produits du règne minéral de la monarchie prussienne* (1786). Consult Reimann, *Abhandlungen zur Geschichte Friedrichs des Grossen* (Gotha, 1892).

HEINLEIN, hīn'līn, Heinrich (1803-85). A German landscape painter, born at Weilburg, Nassau. He studied drawing and architecture at Mannheim and Munich, and then devoted himself to the painting of landscape, and became one of the first German artists in that genre. His pictures include: "Poachers Attacked in Their Camp" (1823); "View in Grisons" (1839), Leipzig Museum; "The Valley of the Engadine," "Landscape with Castle Tyrol" (Karlsruhe Gallery); "Two Alpine Views" (New Pinakothek, Munich); "Mountain Landscape After Storm" (Vienna Museum).

HEINRICH, hīn'rĭk, Gustav (1845—). An Hungarian literary critic, born at Budapest and educated at Leipzig and Vienna. He was appointed professor of German philology in the university at Budapest, and became a prominent educator and a special student of the interrelation of German and Hungarian literature. He has edited many German classics for Hungarian readers, and has written: *Bankban in der deutschen Dichtung* (1879); *Boccaccios Leben und Werke* (1882); *Etzelburg und die ungarische Hunnensage* (1882); *Deutsche Verslehre* (2d ed. 1878); *Faust-Studien* (1888); *Kudrun* (1885), and a valuable history of German literature, in Hungarian.

HEINRICH DER GLÎCHEZARE, dĕr glĕk'-e-tsä're (The Hypocrite). A German poet of the twelfth century, and possibly a traveling player. He wrote (1170) the earliest of German poems on Reynard the Fox, patterned after French models. Of this poem, *Isengrîmes Nôt*, in its original form, nothing is left save a few fragments, edited by Grimm, *Sendschreiben an K. Lachmann über Reinhart Fuchs* (1840); a revision, only a little later in date, was published by Reissenberger (1886). Consult Büttner, *Studien zu dem Roman de Renart und dem Reinhart Fuchs* (Strassburg, 1891).

HEINRICH DER TEICHNER, dĕr tīk'nĕr. An Austrian didactic poet of the latter half of the fourteenth century. His poetry consists largely of proverbs in rhymed couplets, valuable for their record of the reconstruction of Austrian life of the period. Consult Karajan, *Ueber Heinrich den Teichner* (Vienna, 1855).

HEINRICH VON DEM TÜRLIN, fŏn dăm tür'lĕn. A Carinthian poet of the earlier half of the thirteenth century. His poems deal with the legends of the Round Table, and are modeled after Chrétien de Troyes. His *Der Aventiure Krone*, the story of Sir Gawain, was edited by Scholl (1852); and *Der Mantel*, which relates the story of the marvelous cloak that will fit none but a pure woman, has been published by Karnatsch (1883). Consult Martin, *Zur Gralsage* (Strassburg, 1880).

HEINRICH VON DIESSENHOVEN, dē'-sĕn-hō'fĕn (c.1300-76). A mediæval German historian, canon of the cathedral at Constanz, and chaplain of Pope John XXII. at Avignon. His history completes the ecclesiastical chronicle of Ptolemy of Lucca, and deals with the pontificate of John. It is edited by Böhmer in *Fontes Rerum Germanicarum*, vol. iv. (Stuttgart, 1868).

HEINRICH VON FREIBERG, fŏn frī'bĕrk (or **VRIBERG**). A German poet of the early part of the fourteenth century. He wrote a spiritual poem, *Vom heiligen Kreuze*, probably from a Latin source, edited by Fietz (1881); *Ritterfahrt Johanns von Michelsberg*, written about 1305, edited by Kraus (1888); and a continuation of Gottfried's epic *Tristan*, composed about 1300, in style like Gottfried, but following other originals for material. The farce entitled *Vom Schrätel und vom Wasserbär*, edited in Von der Hagen, *Gesamtabenteuer*, No. 65 (1850), is attributed to Heinrich von Freiberg. Consult Wiggers, *Heinrich von Freiberg als Verfasser des Schwankes vom Schrätel und vom Wasserbaren* (1877).

HEINRICH VON HERFORD, fŏn hĕr'fôrt (?-1370). A German Dominican monk, author of many theological works and of a valuable chronicle, *Liber de Rebus Memorabilibus*. Its latter part is one of the most important sources for the history of the thirteenth and fourteenth centuries, and was edited by Potthast (1859).

HEINRICH VON LAUFENBERG, fŏn lou'-fĕn-bĕrk (c.1390-1460). A German monk and poet, born in Switzerland. He lived at Freiburg and Strassburg, and wrote numerous hymns in honor of the Virgin, of which many are to be found in Wackernagel, *Das deutsche Kirchenlied* (1864-77); a collection of *Carmina Figurata* (1441), also praising Mary; and a German translation of the *Regimen Sanitatis*, under the title *Spiegel menschlichen Heils* (1437).

HEINRICH VON MELK, fŏn mĕlk. A German satirist of the twelfth century, a monk in the Austrian cloister of Melk. He wrote a vivid, bitter satire on the morals of the time, and especially on the condition of the clergy, *Von des Todes Erinnerung*, sometimes called, from its opening line, *Von dem gemeinen Leben*. The *Pfaffenleben*, a poem of like character, but probably not by Heinrich, was published with it (by Heinzel, Berlin, 1867). Consult: Lorenz, *Heinrich von Melk* (Halle, 1886), and Kochendörffer, in the *Zeitschrift für deutsches Altertum*, vol. xxxv. (Berlin, 1890).

HEINRICH VON MORUNGEN, fŏn mō'-rung-en. A German minnesinger, of the end of the twelfth and the first quarter of the thirteenth

century, ranking in beauty and originality next to Walther von der Vogelweide. His poems, showing slightly the influence of classic models and very strongly that of the troubadours of Provence, are edited by Von der Hagen in his *Minnesinger* (1838), and in Lachmann and Haupt's *Des Minnesangs Frühling* (4th ed. 1888). Consult: Michel, *Heinrich von Morungen und die Troubadours* (Strassburg, 1880), and Rössner, *Untersuchungen zu Heinrich von Morungen* (Berlin, 1898).

HEINRICH VON MÜGELN, fôn mü'gĕln (c.1310-c.1375). A German author and scholar, a counselor of Charles IV. at Prague, and later of Rudolph IV. of Austria. His works include translations of Valerius Maximus (first printed 1489), and of the commentary on the Psalms written by Nikolaus of Lyra; an Hungarian chronicle in Latin (edited by Engel, in *Monumenta Ungrica*, 1809); an allegory, *Der meide cranz;* and fables and *minne* poetry (edited by Müller, 1848), which won him a place among the twelve founders of the art of the minnesingers.

HEINRICH VON NEUSTADT, fôn noi'stât. A German poet, born at Wiener-Neustadt, who practiced medicine in Vienna in the first quarter of the fourteenth century. His works, imitative of Wolfram von Eschenbach, include a long romance, patterned after the Latin story of Apollonius of Tyre, but with a curious coloring from Arthurian story; and, on the second advent, *Von Gottes Zukunft*, reminiscent of Alanus ab Insulis's *Anticlaudianus*. Excerpts from the two poems are published in Strohl, *Heinrich von Neustadt* (Vienna, 1875).

HEINRICI, hīn-rē'tsē, Karl Friedrich Georg (1844—). A German Protestant theologian, born at Karkeln, in East Prussia, and educated at Halle and at Berlin, where in 1871 he became docent. In 1873 he became professor at Marburg, and went to Leipzig in 1892. He wrote: *Die Valentinianische Gnosis und die Heilige Schrift* (1781); *Erklärung der Korintherbriefe* (1880-87); the commentary on Corinthians in Meyer's *New Testament Commentary* (last ed. 1896 and 1900); *Schriftforschung und Schriftautorität* (1890); *Theologische Encyklopädie* (1893); and *Beiträge zur Geschichte und Erklärung des Neuen Testaments*, vol. i. (1894).

HEINSE, hīn'se, Johann Jakob Wilhelm (1749-1803). A German novelist, translator, and critic of art, born at Langewiesen in Thuringia. He studied at Schleusingen, at Jena, and at Erfurt, where he met Wieland, who greatly influenced his poetry, and Gleim, who procured for him a place as private tutor at Halberstadt, where he lived under the name of Rost. In 1774 he went to Düsseldorf as editor of *Iris*. Here he became so interested in art that he spent three years in Italy, giving most of the time to Rome. He made the acquaintance of the painter Müller, learned much of Italian art and literature, and widened his knowledge of the art and literature of antiquity. While he was in Italy he translated Tasso's *Gerusalemme Liberata* and the *Orlando* into German prose. On his return to Düsseldorf (1784) he wrote *Ardinghello*, his masterpiece. The Elector of Mainz, Friedrich Karl Joseph, now (1786) made him his lektor, and (1787), at Aschaffenburg, his private secretary. On Friedrich's death his library became the property of the State, and Heinse was made librarian. His earliest work was *Sinngedichte* (1771). This was followed by translations and works in classic vein: *Begebenheiten des Enkolp, aus dem Satyrikon des Petron übersetzt* (1773); *Die Kirschen* (1773), a work of equal obscenity; and *Laidon, oder die eleusinischen Geheimnisse* (1774), with the form of a romance, describing the apotheosis of Lais. Like the last-mentioned work, *Ardinghello, oder die glückseligen Inseln* (last ed. 1838), is little more than a series of dazzling pictures, like Pompeian wall paintings. In *Hildegard von Hohenthal* (last ed. 1838), Heinse gives his ideas on music, and in *Anastasia und das Schachspiel* (last ed. 1831) on chess. *Fiormona, oder Briefe aus Italien* (1803), though usually ascribed to Heinse, is not his work. Consult: *Briefe zwischen Gleim, Heinse und Johannes von Müller*, edited by Körte (Zurich, 1806-08), which gives a good picture of the man, and contains his criticism of the paintings in the Düsseldorf Gallery, and Schober, *Heinse, sein Leben und seine Werke* (Leipzig, 1882).

HEINSIUS, hīn'sī-ōōs, Antonius (1641-1720). A Dutch statesman, celebrated as a formidable opponent of Louis XIV. of France. He was born at Delft, November 22, 1641, and after pursuing the study of law at the University of Leyden entered the service of the State, and became in 1679 pensionary of Delft. He was the confidential friend of William of Orange, upon whose accession to the throne of England, in 1689, Heinsius, as Pensionary of Holland, succeeded to the virtual control of the foreign policy of the Dutch Republic. The friendship between William and Heinsius continued till the former's death, and their correspondence is of capital importance for the light it throws on the intricate political problems of the period from 1688 to the outbreak of the War of the Spanish Succession. Heinsius was instrumental in bringing about the partition treaties of 1698 and 1700 concerning the devolution of the Spanish throne, and contributed to the formation of the Grand Alliance in 1701. Into that struggle against France he entered heart and soul, and after William III.'s death, in 1702, became the virtual leader of the European combination against Louis XIV. The victories of Marlborough and Prince Eugene were due in no little measure to Heinsius's restless activity in the prosecution of the war. Determined upon the total humiliation of France, he spurned the French King's overtures of peace, made as early as 1706, and only the defection of England and the recrudescence of French resistance that followed induced him to agree to the terms of peace at Utrecht. He died August 3, 1720.

HEINSIUS, Daniel (1580-1655). A Dutch scholar of distinction, and a pupil of Scaliger, born in Ghent. He was a leading figure of the Dutch Renaissance, professor of Greek and Latin at Leyden, and a facile Latin poet. He wrote *Iambi* (1602); *Elegiæ* (1603); *Emblemata Amatoria*, with Dutch verses (1604); *Poemata* (1605). He edited Theocritus, Bion, Moschus, Horace, Aristotle, Seneca, Terence, and Livy, and published Latin *Orationes* (1609 and 1621) and other learned works as well as a Dutch tragedy, *The Massacre of the Innocents* (1613), and Dutch *Poems* (1616).—Nicolaas Heinsius (1620-81), a son of Daniel, was born in Leyden, and educated in the university of his native town. For more

than twenty-five years he led the busy life of traveler, scholar, diplomat, and poet. He ransacked the libraries of France and Italy in search of classical manuscripts. In 1650 he entered the service of Christina of Sweden, and in 1654 became Dutch Minister at Stockholm. In 1669 he visited Russia, and two years later retired to private life. He published editions of Vergil, Ovid, Prudentius, Vellius Patereulus, and Valerius Flaccus, based on manuscripts in his possession. He was also the author of commentaries on many other poets of antiquity. He is said to have supplied Milton with facts for use against Salmasius (q.v.). His Latin poems were published at Amsterdam in 1666. He died at The Hague, October 7, 1681.—His illegitimate son NICOLAAS (1655-?) was a scapegrace of remarkable talent, who wrote the only original Dutch romance of the seventeenth century, *The Delightful Adventures and Wonderful Life of Mirander* (1675), a curious anticipation of *Gil Blas*. He fled from Holland a disowned criminal in 1677, and died in obscurity.

HEINTZELMAN, hīn'tsel mān, SAMUEL PETER (1805-80). An American soldier, born at Manheim, Lancaster County, Pa. He graduated at West Point in 1826, and was assigned to the Second Infantry, with which he served on the frontier. He took part in the wars with the Florida Indians from 1835 to 1841, becoming a captain in 1838; served with his regiment in the Mexican War, and received the brevet of major for gallantry at the battle of Huamantla, October 7, 1847. Later he served in California, accompanying the expedition against the Yuma Indians in 1852, and in Texas. He attained the rank of major in 1855, and at the outbreak of the Civil War became colonel, and inspector-general of the Department of Washington. On May 17, 1861, he was commissioned brigadier-general of volunteers, and was in command of the forces which occupied Alexandria, Va. In McClellan's Peninsular campaign of 1862 he commanded the Third, and later also the Fourth, Army Corps, and participated in all of the important battles. He received his commission of major-general of volunteers on the day of the battle of Williamsburg (May 5, 1862), and for gallantry at the battle of Fair Oaks received the brevet rank of brigadier-general in the Regular Army. He fought also at Savage's Station, Glendale, and Malvern Hill, and later in the year at the second battle of Bull Run and at Chantilly. In the winter of 1862-63 he was in command of the defenses of Washington, and from February to October, 1863, of the Department of Washington. During the remainder of the war he was not in the field, serving as commander of the Department of the West in 1864, and on court-martial duty in 1865. In March, 1865, he was brevetted major-general in the United States Army for his conduct at Williamsburg, and in 1869 was retired, on account of age, with the full rank of major-general.

HEINZE, hīn'tse, KARL FRIEDRICH RUDOLF (1825-96). A German criminologist, born at Saalfeld, and educated at Leipzig. He served successively in the judiciary of Meiningen and of Saxony; in 1865 was appointed professor at Leipzig, and eight years afterwards at Heidelberg. He was three times representative of the University of Leipzig in the Saxon Diet, and was a prominent member of the party of the opposition. He wrote: *Parallelen zwischen der englischen Jury und dem französisch-deutschen Geschworengericht* (1864); *Ein deutsches Geschworengericht* (1865); *Das Recht der Untersuchungshaft* (1865); *Verhältnis des Reichsstrafrechts zu dem Landesstrafrecht* (1871); and a report for the International Congress for Prison Reform at Saint Petersburg, *De quelle façon l'excès peut-être envisagée dans la législation pénale* (1890).

HEINZEL, hīn'tsel, RICHARD (1838—). An Austrian philologist, born in Capo d'Istria, and educated at Vienna. After teaching in gymnasia at Triest, Vienna, and Linz, he was appointed professor of German at Gratz (1868), and then at Vienna (1873). His work comprises discussions of Germanic phonetics, Teutonic myths, and the relation of German poetry to French. Among his writings are: *Heinrich von Melk* (1867); *Ueber den Stil der altgermanischen Poesie* (1875); *Beschreibung der isländischen Saga* (1880); *Ueber die Nibelungensage* (1885); *Ueber die Hervarasaga* (1887); *Ueber die Walthersage* (1888); *Ueber die ostgotische Heldensage* (1889); *Abhandlungen zum altdeutschen Drama* (1896); *Beschreibung des geistlichen Schauspiels im deutschen Mittelalter* (1898); *Ueber die französischen Gralromane* (1891); *Ueber das Gedicht von König Orendel* (1892).

HEINZEN, hīn'tsen, PETER (better known as KARL) (1809-80). A German-American author, born at Grevenbroich, and educated at Bonn, whence he was expelled because of his radicalism. After two years in the Dutch Army he returned to Germany, and entered the Prussian Government service. But his contributions to the *Leipziger Allgemeine Zeitung* and to the *Rheinische Zeitung* excited the displeasure of the Government; both journals were suppressed; his book, *Die preussische Büreaukratie* (1845), was confiscated, and he escaped trial by flight to Belgium, Switzerland, and finally to America. He returned to take part in the Revolution of 1848; then came once more to the United States; lived in New York, Louisville, Cincinnati, and Boston, and published the very radical organ, the *Pionier*. His collected works were published at Boston (1868-72), and include: *Gedichte; Sechs Briefe an einen frommen Mann; Die Teutschen und die Amerikaner;* and *The True Character of Humboldt*. Many of his writings were published by the Society for the Propagation of Radicalism in the United States—e.g. *Rights of Women* (1891), and *Teutscher Radikalismus in Amerika* (1898).

HEIR (Lat. *heres*). At Roman law, the estate of a deceased person always passed as an entirety (by 'universal succession') to one or more persons described as heirs. The heir or heirs, if not appointed by testament, were designated by the law; and, in the later development of the Roman law, certain near relatives of a testator were entitled to a share of his estate even against his will, unless they had so acted as to give him legal ground for disinheriting them. (See SUCCESSION.) If the heir, whether appointed by testament or designated by law, was under the decedent's household authority, the inheritance vested in him immediately. If, on the other hand, the inheritance was given by testament or assigned by law to a person out of the household, the latter became heir only by

an act of entry. The chief practical importance of the distinction lay in the fact that inheritance established a merger, or 'confusion,' of the inherited estate with the personal estate of the heir, and that the heir was accordingly personally liable for the debts of the estate. If these exceeded the assets, the forced succession of the household heir was an injury to him. The prætors accordingly, toward the close of the Republican period, gave such heirs protection against the creditors of the estate, if they abstained from interfering with the assets—a change which practically abolished the forced or 'necessary' succession. Justinian went further; he allowed the heir who promptly made an accurate list of the assets to take the inheritance without incurring any personal liability for its debts (*beneficium inventarii*). See INVENTORY.

The position of a testamentary heir at Roman law was substantially identical with that of an English executor who is also a residuary legatee. The testamentary heir paid the debts and all special bequests (*legata*), and kept the remainder of the estate. The position of the intestate heir was substantially identical with that of an English administrator who is also next of kin. If the Roman heir was an infant or a lunatic, his guardian administered the inheritance.

MEDIÆVAL LAW. To the Germanic peoples, including the English, testaments were originally unknown. They received them through the Church. Even then they were reluctant to admit that a person could dispose by testament of the real estate, which in the Germanic view belonged to the family rather than to its head. The direct heirs, the 'born' heirs, had rights in the land of which they could not be deprived. The development of the feudal system emphasized in the law of succession, as in other fields of the law, the distinction between realty and personalty. To the Church authorities, accordingly, mediæval custom assigned not only the execution of testaments disposing of the personalty, but also, in many countries, the administration and distribution of the personal estate in cases of intestacy. On the Continent and in Scotland, at the close of the Middle Ages, the reception of the Roman law (see CIVIL LAW) effaced these distinctions; but in England they still underlie the whole law of inheritance and distribution (q.v.). See also DESCENT.

MODERN CIVIL CODES. The modern codes of Europe have reëstablished the principle of the universal succession; the estate of a decedent passes as an entirety to the testamentary or legal heir or heirs. The Roman distinction between household heirs and outside heirs has disappeared; in both cases the inheritance vests at the moment of death; in both cases there is a right of renunciation, and usually a right of entry, with the 'benefit of inventory.' In cases of intestacy, the legal heirs administer the estate; the courts appoint administrators only when the intestate heirs cannot be found, or when they all renounce the inheritance. Unless a testator has appointed special executors, the testamentary heirs liquidate the estate and pay the legacies and statutory shares. In this matter, however, the French law is different. In France, if there be near relatives who are entitled to statutory shares, these, and not the testamentary heirs, administer the estate. The latter are termed 'universal legatees,' and they have the rights of heirs only in the absence of the 'legitimate heirs.'

ENGLISH AND AMERICAN LAW. The feudal separation of real and personal property has maintained itself in the common-law system, even to the present time. It appears in its extremest form in the law of inheritance. The personal property of one who dies intestate passes to a person who may or may not be of the blood of the decedent, and only for purposes of administration, the distribution of the surplus after the payment of debts, etc., being determined by statutes of distribution. Only the real property 'descends,' according to fixed canons of inheritance, to the next of blood of the decedent, under the description of the heir. In our legal system, then, the term heir has reference always to the person or persons to whom the real (not the personal) property passes, and that not by will, but only on intestacy. In the main the English canons of descent laid down by Blackstone still govern the determination of the heirship or inheritance of estates, though these have been considerably modified by statute both in England and the United States. See DESCENT.

In Scotch law, the term heir is often used in a loose sense to denote the persons entitled to succeed to the heritable as well as to the movable estate. In Scotland the same rule exists as in England, that if a person do not by deed *mortis causa* (which operates like an English will) dispone or convey his estate to some other person, the law points out who is to take such estate, and that person is the heir-at-law. The rules by which the heir to heritable estate in Scotland is pointed out differ considerably from the English rules. These rules are the same as to the descendants of the deceased person, A. But after A's descendants are exhausted, differences begin; for then it is not the father, nor yet the eldest brother of A, but the next younger brother of A, who next succeeds; then the next younger again, until the youngest brother—after whom and his descendants comes A's next elder brother, and so on upward to the eldest brother of all. In Scotland, when females succeed equally, they are called heirs-portioners. The mother never succeeds in any event, or any relatives, except brothers and sisters german who trace their descent through her.

Formerly, upon the death of the owner, his heritable estate did not immediately vest in the heir, but lay in an intermediate state, then called the *hæreditas jacens*, and the person entitled to be the heir had to be summoned to the inheritance, and enter upon the estate. This was altered by statute in 1874, and the estate now vests at once upon the death of the former owner (37 and 38 Vict., c. 94). The civil-law rule also exists in Scotland, that the heir-at-law takes the estates subject to his ancestor's debts. Formerly, indeed, he used to be liable for all the debts, though far exceeding the property left, provided that he did not take certain precautions to escape this passive representation, as it was called; for the barbarous maxim prevailed, *hæres est eadem persona cum defuncto.*

HEIR APPARENT. In the common-law system, the person who is entitled to succeed to the inheritance of real property if he outlive his ancestor. The term heir alone is not properly applicable to any one so long as the ancestor from whom he expects to inherit is still alive

(*nemo est hæres viventis*). The expectant heir may be either the person first entitled under the canons of descent, as the eldest son, and who cannot be displaced by the subsequent birth of a nearer relative of the ancestor, or he may be a person in the second or any later degree of consanguinity—in which case he is liable to be displaced by the birth of a son or other person having a prior claim to the inheritance. The expectant heir in the former case is known as the heir apparent, in the latter case as the *heir presumptive*. Under the rule of primogeniture, which still obtains in England, a daughter would be only an heir presumptive, as the subsequent birth of a son to the father would displace her; whereas the eldest living son is, while the father lives, the heir apparent. A younger son, however, is not entitled to the designation of heir presumptive so long as his elder brother lives, although by the death of the latter he would at once become heir apparent.

In Scotland the phrase is also sometimes used popularly in this sense; but the words 'apparent heir,' when used technically there, mean quite a different thing, viz. the person who, after his ancestor's death, is entitled to succeed, provided he make up his titles, but who has not yet actually done so. The apparent heir has a year to deliberate, called the *annus deliberandi*, whether he will enter upon the property, because the responsibility is so much greater in Scotland than in England.

Consult the authorities referred to under CIVIL LAW; DESCENT; LAW; REAL PROPERTY, etc.

HEIR-AT-LAW, THE. A comedy by George Colman the Younger, in five acts, produced in 1797, and still occasionally brought out.

HEIRESS. In heraldry, a lady having no brothers who leave issue. The husband of an heiress is entitled to bear her arms in an escutcheon of pretense—i.e. a small escutcheon in the centre of his paternal shield—and the children of an heiress may quarter her arms with their paternal coat. Neither practice is of very early date in heraldry.

HEIRLOOM. In English law, chattels which in some localities go to the heir-at-law by special custom, instead of passing, like other personal property, to the executor or administrator of the decedent. The chattels usually comprehended within this description are such homely but necessary articles as the best bed, table, pot, pan, cart, and the like. But articles of honor and ornament may fall within the category of heirlooms, such as family portraits, ducal coronets, the Crown jewels, etc. The origin of the right is obscure, and it is of rare occurrence. In America it is wholly unknown. In Scotland a somewhat similar, but by no means identical, phrase is used, viz. *heirship movables*, which connotes a wider right, and includes the best articles of furniture in the house of a person who dies leaving heritable property. The extent of this right is also not clearly settled. Consult the *Commentaries* of Blackstone and Erskine.

HEIR OF LINNE, lin. A ballad of unknown date and authorship, preserved in Percy's *Reliques*. It contains the story of a spendthrift who, having sold his patrimony and spent the proceeds, betakes himself to a lodge which alone he has preserved, and by the breaking of the rope with which he tries to hang himself discovers a hidden treasure, and with it redeems his inheritance.

HEIS, hīs, EDUARD (1806-77). A German astronomer, born at Cologne, and educated at Bonn. He taught at Cologne and Aix-la-Chapelle, and in 1852 was appointed professor of mathematics and astronomy at Münster. Heis edited *Wöchentliche Unterhaltungen aus dem Gebiete der Astronomie und Meteorologie*, and was author of: *Atlas Cœlestis Novus*, marking all stars visible to the naked eye (1872); *Zodiallicht-Beobachtungen* (1875); *Sammlung von Beispielen und Aufgaben aus der allgemeinen Arithmetik und Algebra* (95th ed. 1896); and, with Schweiler, a *Lehrbuch der Geometrie*, in three volumes.

HEISE, hī'ze, PEDER (1830-79). A Danish composer, born at Copenhagen. He studied under Lund, Berggreen, Hauptmann, and Gade. He was a teacher in Copenhagen, and at the Academy of Soröe, and is the author of a number of songs, overtures, cantatas, and sonatas, besides two successful operas, *Pashaens Datter* (1869) and *Drot og Marsk* (1878). He also wrote a ballet, and the incidental music to dramas by Ibsen, Munch, and Von der Recke.

HEISS, hīs, MICHAEL (1818-90). An American prelate, Archbishop of Milwaukee. He was born at Pfahldorf, Bavaria, studied at Munich, and was ordained in 1840. Two years later he came to the United States, engaged in missionary work in Kentucky and Ohio, and afterwards at Milwaukee, where he founded the Seminary of Saint Francis, of which he was first rector. He was consecrated first Bishop of La Crosse, Wis., in 1868, and established Saint John's College and other schools in his diocese. In 1880 he was appointed coadjutor to the Archbishop of Milwaukee, and two years later became second Archbishop. He was a member of the Vatican Council of 1869-70.

HEJIRA, hĕj'ĭ-rȧ (Ar. *hyra*, flight, from *hajara*, to abandon). The flight of Mohammed from Mecca to Medina to escape the persecution of his kinsmen, the Koreish (see MOHAMMED), and the starting-point of the Mohommedan Era. The exact day of the flight is uncertain. The custom of dating events with reference to it originated with Mohammed himself, but the calendar was first instituted by Omar, seventeen years after the event, and was made to begin, not with the day of the flight, but with the first day of the year (i.e. the first of the month Muharram) in which it took place, which corresponds with July 16, 622, of the Christian Era. The Mohammedan year is a lunar year, of 354 days, 9 hours, hence about 11 days shorter than the Christian year, and this fact must be borne in mind in computing the date of the Christian calendar corresponding to any given Mohammedan date. An easy rule, which will give the year approximately, is to deduct three per cent. from the Mohammedan year and add the result to 622. Thus the year of the Hejira 1321 will be found to correspond roughly to the year 1903 of the Christian Era ($1321-40+622=1903$). For more accurate results, consult Wüstenfeld, *Vergleichungstabellen der mohammedanischen und christlichen Zeitrechnung*, continued by Mahler (Leipzig, 1854-87).

HEL, hāl (Icel., probably meaning hidden, sc. goddess). The Northern goddess of the dead, who dwelt beneath one of the three roots of the sacred ash Yggdrasil, and was the daughter of Loki (q.v.), by the giantess Angurboda. Hel, together with her brothers, the wolf Fenrir and the serpent Jormundgand, was bred up in the giants' home of Jötunheim, where she remained till, at the request of the Æsir, or gods, the All-father sent for her and her brothers. Knowing that by their origin these children must prove a source of calamity, he resolved upon their destruction, and after casting the serpent into the deep ocean which surrounds all lands, and where it has grown so large that it encircles the whole world and bites its own tail, he hurled Hel into Niflheim (q.v.), over which he gave her authority, and in which she was to assign places to all who die of sickness and age. Her abode is surrounded by a high inclosure with massive gates. Her dwelling is *elindnir* (dark clouds); her dish, *hungr* (hunger); her knife, *sullt* (starvation); her servants, *ganglâti* (slow moving); her bed, *kör* (sickness); and her curtains, *blikiandaböl* (splendid misery); and she is easily recognized by her fierce aspect and her half black, half flesh-colored skin; and she rides a horse with only three feet. Faith in this goddess is not yet extinct. Hel-shoes (hell-shoon) are still put on the feet of the dead, and her dog is heard barking to give warning that death is at hand. In Norway, when any one recovers from dangerous illness he is said to have given Hel a bushel of oats, in allusion to the belief that she wanders around in the form of a horse.

After the introduction and diffusion of Christianity, the ideas personified in Hel gradually merged, among all the races of Northern and German descent, in the local conception of a hell, or dark abode of the dead. Consult: Thorpe, *Northern Mythology* (London, 1863); Grimm, *Mythologie*, edited by Meyer (Berlin, 1875-78).

HELBIG, hĕl'bĭg, Wolfgang (1839—). A German archæologist. He was born at Dresden, and was educated at Göttingen and Bonn. After he had taught one year in the Joachimsthaler Gymnasium of Berlin, he went to Rome as scholar in the German Archæological Institute, of which he was made second secretary in 1865. This office he resigned in 1885, but did not leave Rome, save for occasional trips through Italy, Greece, Northern Africa, France, and Russia. His more important works are: *Wandgemälde der vom Vesuv verschütteten Städte Campaniens* (1868); *Untersuchungen über die campanische Wandmalerei* (1873); *Beiträge zur altitalienischen Kultur- und Kunstgeschichte* (1879); *Das homerische Epos aus den Denkmalern erläutert* (1887); *Führer durch die öffentlichen Sammlungen klassischer Altertümer in Rom* (last ed. 1899); *La collection Barracco d'après la classification et avec le texte de G. Barracco et W. Helbig* (1893).

HELD, hĕlt, Adolf (1844-80). A German economist, born at Würzburg, and educated there, at Munich, and at Berlin, where, in 1880, he became professor. He was drowned in the same year. A 'Socialist of the chair,' Held wrote: *Carous Sozialwissenschaft und das Merkantilsystem* (1866); *Die Einkommensteuer* (1872); *Die deutsche Arbeiterpresse der Gegenwart* (1873); *Grundriss für Vorlesungen über Nationalökonomie* (1876); *Sozialismus, Sozialdemokratie und Sozialpolitik* (1878); and, edited by Knapp, *Zwei Bücher zur sozialen Geschichte Englands* (1881).

HELD, Hans Heinrich Ludwig von (1764-1842). A Prussian patriot, born at Auras, and educated at Frankfort-on-the-Oder, Halle, and Helmstedt. For his open attack on the integrity of the Minister, Count Hoym, he was removed from his post in the customs service at Posen (1797); but four years afterwards he published the famous 'Black Book'—so called from its binding—a second attack on the Ministers Hoym and Goldbeck, under the title *Die wahren Jakobiner im preussischen Staat, oder aktenmässige Darstellung der bösen Ränke und betrügerischen Dienstführung zweier preussischen Staatsminister*. For this publication, after a long trial, he was sentenced to eighteen months in prison. His later writings were two pamphlets attacking Napoleon, and, in 1805, a eulogy of his patron, Struensee. In 1812 he received a minor appointment from the Minister Hardenberg; but the ill fortune of the preceding years had broken his spirit, and when the State money in his possession was stolen from him he despaired of life and committed suicide. He wrote a *Geschichte der drei Belagerungen Kolbergs im Siebenjährigen Kriege* (1848). Consult Grünhagen, *Zerboni und Held in ihren Konflikten mit der Staatsgewalt* (Berlin, 1897).

HELDENBUCH, hĕl'den-bōōg (Ger., book of heroes). A collection of old epic poems, connected with the heroic legends of Germany. No manuscript exists, and the oldest printed edition is without date. The second copy was printed in 1491, and was afterwards reprinted in 1509, 1545, 1560, and 1590, and edited by A. von Keller at Stuttgart in 1867. It is an adaptation preserving the general characteristics of the older poetic form, and contains the poems "Ornit," "Hugdietrich," "Wolfdietrich," the "Great Rosegarden," and the "Little Rosegarden, or King Laurin." A similar but inferior adaptation of the same material, with additions from the tales of Attila and Dietrich, appeared about 1472. Of the latter work one manuscript exists, now in Dresden. The collection is known by the name of one of its two writers, Kaspar von der Rhön (Gaspard de la Roen).

HELDER, hĕl'dĕr. A strongly fortified seaport town of the Netherlands, situated on the narrow passage of Marsdiep which separates the mainland of the Province of North Holland from the island of Texel (Map: Netherlands, C 2). The city and surrounding country are protected from the inroads of the sea by an enormous dike nearly 5 miles long and 30 feet wide at the top, built of Norwegian granite. A road on the top of the dike connects Helder with the harbor of Nieuwediep, the sea entrance to the North Holland Canal, which connects Helder with Amsterdam. Nieuwediep is one of the chief naval stations of the Netherlands, where are large docks, ship-yards, barracks and magazines, a naval hospital, and the royal cadet school. Owing to its position at the northern end of the North Holland Canal, Helder has rapidly developed from a small fishing village into a city. Population, in 1900, 25,159. Helder is noted for the famous naval battle which took

place there in 1673 between the united fleets of England and France, on one side, and the Dutch, on the other. The latter, led by Tromp and De Ruyter, were victorious. The fortifications of the town were begun in 1811 by Napoleon, and completed afterwards by the Dutch.

HELE, hā'le, PETER (1480-1542). A German clockmaker of Nuremberg, who is credited with having made the first pocket timepiece, about 1511. His name is also spelled 'Hell' and 'Henlein.'

HEL'EN (Lat., from Gk. Ἑλένη). The daughter of Zeus and Leda (q.v.), wife of Tyndareus, King of Sparta, or, according to the epic poem *Cypria*, of Zeus and Nemesis, whom the god pursued in the form of a swan. Nemesis brought forth an egg, which was found by Leda, who on the birth of Helen reared her as her foster-child. According to the ancient legend she was so exceedingly beautiful that at the age of ten she was carried off by Theseus and Pirithous, but was recovered subsequently by her brothers, Castor and Pollux. Tyndareus afterwards engaged her suitors, who numbered about thirty, in a solemn oath to unite together to aid the husband whom Helen should choose, in case of any attempts being again made to carry her off. In accordance with this oath, her husband, Menelaus, when she was afterwards carried off by Paris, son of Priam, King of Troy, summoned all the princes of Greece to avenge the injury he had sustained, and thus gave rise to the Trojan War. The ordinary legend states that after the death of Paris she voluntarily married his brother, Deïphobus, and that on the taking of Troy, in order to recover the favor of Menelaus, she betrayed Deïphobus into his hands. Another version told how she fled to the temple of Aphrodite, and was pursued with drawn sword by Menelaus, but such was the power of her beauty that he laid aside his thought of vengeance, and took her once more as his wife. Their voyage home was long, as they were driven to Egypt, but at last reached Sparta in safety, where the *Odyssey* shows them living in happiness. By her husband Menelaus she had one daughter, Hermione, but some writers said that by Theseus she was the mother of Iphigenia. Of her death also there were many versions. Her grave was shown at Therapne, near Sparta, where she and Menelaus were worshiped. On the other hand, the Rhodians told how she was driven out of Sparta after the death of Menelaus, and came to her friend, Polyxo, in Rhodes. Polyxo, however, had lost her husband in the Trojan War, and consequently forced Helen to hang herself. Hence she was worshiped at Rhodes in connection with this tree, as Helena δενδρῖτος. Another story told how she was translated by the gods to the Islands of the Blest, where she was wedded to Achilles. She received divine honors at many places, and was believed by the sailors to appear in the single flame of Saint Elmo's fire, which was regarded as a sign of disaster, while the double flame, or Castor and Pollux, was believed to insure safety. In art, scenes from the story of Helen are frequent, and represent almost all the episodes in her eventful life. It was a curious variation that Stesichorus introduced, in that he made Helen remain in Egypt, whither she had come with Paris on her way to Troy, detained by the King, who later restored her to her husband. Paris took to Troy only a phantom, for whom Greeks and Trojans fought. Much in the nature of the legends of Helen, and in the characteristics of her worship, seems to indicate that she was originally a moon-goddess, who has been superseded by Selene and Artemis, and thus transferred to the heroic legends. For a full collection of the ancient material relating to Helen, consult Engelmann's article in Roscher, *Lexikon der griechischen und römischen Mythologie*, vol. i. (Leipzig, 1886-90).

HELEN: A TALE. A novel by Maria Edgeworth, published in 1834. It was her last story, and, though not lacking in power, had not the success of her earlier work.

HELENA. A city and the county-seat of Phillips County, Ark., 82 miles south by west of Memphis, Tenn.; on the Mississippi River, and on the Arkansas Midland, the Saint Louis, Iron Mountain and Southern, and the Yazoo and Mississippi Valley railroads (Map: Arkansas, E 3). It is an important shipping point for lumber, cotton, and cottonseed oil; and has lumber-mills, cotton-compresses, cottonseed-oil mills, foundries, etc. Here on July 4, 1863, General Holmes, commanding a Confederate force of 9000, attacked General Prentiss with a Union army of about 4500, but was repulsed with a loss in killed, wounded, and prisoners of one-fifth his number. Population, in 1890, 5189; in 1900, 5550.

HELENA. A city, the capital of Montana, and the county-seat of Lewis and Clarke County, 73 miles north by east of Butte; on the Great Northern and the Northern Pacific railroads (Map: Montana, C 2). It lies at an elevation of 4200 feet, in Prickly Pear Valley, a fertile agricultural district, and is surrounded by a highly productive mineral region. It is the commercial centre of the State; is extensively engaged in gold, silver, and iron mining; and has foundries and machine-shops, flour, saw, and planing mills, quartz-crushing plants, and smelters. From the famous Last Chance Gulch which traverses the city, it is estimated that more than $30,000,000 worth of gold has been mined. Helena was settled as a mining camp in 1864, and laid out as a town in the same year, and was incorporated in 1881. The city is the seat of the Montana Wesleyan University (Methodist Episcopal), opened in 1890, and has public, State, and other libraries, and a United States Assay Office. The State Capitol is an imposing structure. Under the general code provision passed in 1895, the city government is vested in a mayor, elected biennially, and a unicameral council which confirms the executive's nominations to all subordinate offices except those of police magistrate and city treasurer, which are filled by popular election. Population, in 1890, 13,834; in 1900, 10,770.

HELENA (Lat., from Gk. Ἑλένη, *Helenē*). The name of several saints of the Catholic Church, the most celebrated of whom is the Empress Helena, wife of Constantius Chlorus, and mother of Constantine the Great. She was born probably in Dardania, about 248, became concubine to Constantius and bore him Constantine about 274, when she became his wife; but in 292 when he became Cæsar, Constantius divorced her so that he might marry another. In 306 Constantine succeeded his father, and it is likely re-

called his mother to the Court. It is also probable that late in life Helena became a Christian through Constantine's influence, and won the gratitude of the Christian community by her zeal for the advancement of religion, and her acts of piety and munificence. Among the public events of her Christian life, the most remarkable is the discovery (according to the belief of the Church) of the cross of the Lord during the memorable visit she made to the Holy Land, after 326. (See CROSS, INVENTION OF; HOLY SEPULCHRE.) She died in the year 328, or later. Other saints of the same name are Olga, wife of the Grand Prince Igor of Kiev (died 969), who is honored in the Russian Church; and Helena of Sköfde, Sweden, who suffered martyrdom in the twelfth century.

HELENA. A fantastic tragedy by Euripides (B.C. 412), founded on the story that the real Helen never was at Troy, but was represented there by a phantom, while she was carried to Egypt by the gods. There she was found by Menelaus after the Trojan War and rescued from the Egyptian King, and the phantom Helen vanished.

HELENA. (1) The leading character in Shakespeare's *All's Well that Ends Well*, in love with Bertram, who leaves her on their wedding day. (2) An Athenian lady, enamored of Demetrius, in Shakespeare's *Midsummer Night's Dream*.

HELENA, THE. A name given in Germany to Act iii., Part 2 of Goethe's *Faust*, which was begun in 1800 and published separately in 1827, under the title of *Helena: A Classic-Romantic Phantasmagoria*. It is a complete allegorical poem in itself, and only slightly connected with the action of the drama. In it Helen marries Faust, signifying the fostering of Hellenism in German literature, and bears him a son Euphorian, typifying Byron, who soon destroys himself by his restless activity. Helen also disappears, leaving Faust only her veil and garments.

HÉLÈNE, ā'lān', LOUISE ELISABETH, Duchess of Orleans. See ORLEANS.

HELENSBURGH, hĕl'ĕnz-bŭr'ŭ. A favorite watering-place in Dumbarton, Scotland, on the right bank of the Firth of Clyde, opposite Greenock, from which it is four miles distant (Map: Scotland, D 3). Population, in 1891, 8409; in 1901, 8554.

HEL'ENUS (Lat., from Gk. Ἕλενος, *Helenos*). The one son of Priam to survive the siege of Troy. After the death of Paris, he vainly wooed Helen, and either withdrew to Mount Ida, where at the instance of Calchas he was captured by Odysseus, or deserted to the Greeks outright. He was the twin brother of Cassandra, and, like her, gifted with prophecy. He declared that Troy could not be subdued without Neoptolemus and Philoctetes, and his was the suggestion that the Greeks steal the Palladium and build the wooden horse. Fallen, along with Andromache, to the share of Neoptolemus, he won this prince's good will by foretelling the tempest which the embarking Greeks should encounter, and by dissuading him from starting. He was taken to Phthia, but advised his master to settle in Epirus. Grateful for his fidelity, Neoptolemus bestowed upon him Andromache, by whom he had a son, Cestrinus. After the death of his King, Helenus ruled over a part of Epirus which he called Chaonia.

HELFERT, hĕl'fĕrt, ALEXANDER, Baron (1820—). An Austrian author and politician, born at Prague, where his father, an ecclesiastical historian, was professor. After serving as assistant to his father and as instructor at the University of Cracow, he was elected to the Austrian Parliament of 1848. He soon became connected with the Ministry of Education, of which (1860-61) he was provisional head, and then was made head of the educational bureau in the Ministry of State, and president of the Imperial Commission on Art and Archæology. He became prominent as leader of the Clerical Federalist Party in the Austrian House of Peers, which he entered in 1881. He was editor of the *Oesterreichisches Jahrbuch* (1885 sq.), and of a popular *Oesterreichische Geschichte* (1863); author of many historical works, of which the following may be mentioned: *Huss und Hieronymus* (1853); *Die österreichische Volksschule* (1860-61); *Die Schlacht bei Kulm, 1813* (1863); *Geschichte Oesterreichs vom Ausgange des Wiener Oktoberaufstandes 1848* (1869-86); *Maria Luise* (1873); *Joachim Murat* (1878); *Fabrizio Ruffo* (1882); *1814. Ausgang der französischen Herrschaft in Oberitalien* (1890); *Gregor XVI. und Pius IX.* (1896); and *Kaiser Franz I. von Oesterreich und die Stiftung des lombardo-venetianischen Königreichs* (1901).

HELGOLAND, hĕl'gō-länt, or **HELIGOLAND.** A small German island in the North Sea, situated about 35 miles off the western coast of Schleswig-Holstein, in latitude 54° 10′ N., and longitude 7° 53′ E. (Map: Germany, B 1). It covers only a little over one-fifth of a square mile. A few centuries ago the island had five times its present area, but the sea is fast consuming it. Helgoland has two good ports, one on its northern and another on its southern side. The inhabitants are supported chiefly by fishing and commerce, by serving as pilots, and by catering to the needs of the strangers who come for sea-bathing. A lighthouse stands on the cliff near the village. Helgoland is important strategically, and is strongly fortified. The population in 1900 was 2307. The natives are of Frisian origin and speak a Frisian dialect, although German is the official language. Helgoland was anciently sacred to the goddess Hertha, and was known as Fosetisland, from the Frisian goddess Foseta, who had a temple on the island. From the middle of the tenth century it was an independent republic, but came into the possession of the dukes of Schleswig in the fourteenth century, and was captured in the beginning of the eighteenth century by Denmark. In 1807 it was occupied by Great Britain, to whom it was officially ceded by Denmark in 1814. By treaty between England and Germany the island became a German possession in 1890.

HELI'ACAL RISING (from Lat. *heliacus*, Gk. ἡλιακός, *hēliakos*, pertaining to the sun, from ἥλιος, *hēlios*, sun; connected with Lat. *sol*, Goth. *sawil*, AS., Icel. *sōl*, Ir. *sul*, Lith., Lett., OPruss. *sauls*, Skt. *sūra*, *svar*, sun). A star is said to rise heliacally when it rises just before the sun. When the sun approaches a star which is near the ecliptic, the star becomes for a season invisible—the heavens being too bright in the quarters of sunrise and sunset, at the time of its

rising and setting, to allow it to be seen. But when the sun, progressing in its apparent orbit, separates from the star, and the latter begins to rise first, it in time rises so much earlier than the sun as just to be visible before daylight. The heliacal risings of various bright stars, such as Sirius, were used by the ancients to mark definite dates in the year. See CANICULA.

HELIADE-RADULESCU, ēl'ī-äd rä'doo-lĕs'-kōō, JOAN (1802-72). A Rumanian author, born at Targovistea, and educated under Lazare at Saint Sava until this school was closed by the Government, in 1821. Then he went to Bucharest, as professor and publisher; founded the *Curierul Roman* (1831-48) and the *Curierul de Ambe Sexe* (1840-44), the earliest Rumanian literary periodicals, and busied himself with almost endless translations—of the Bible, of Dante, Aristotle, Tasso, Molière, Ossian, Byron, and Lamartine. He took so active a part in the Revolution of 1848 that he became a member of the Provisional Government, and in consequence was banished when the Russians and Turks overthrew the Government. He returned to Bucharest with Omer Pasha in 1854. In his later years he lost much of his national influence, and became insane shortly before his death. He wrote: *Paralelismul intre dialectele roman si italian* (1841); *Souvenirs et impressions d'un proscrit* (1850); *Le protectorat du Czar* (1850); and a *Mémoire sur l'histoire de la régénération roumaine* (1851); an heroic drama, *Mircea* (1844), and many other plays; a national epic, *Mihaida* (1846); and *Cursŭ de poesie generală* (1868 sqq.).

HELI'ADES, or **HELI'ADÆ** (Lat., from Gk. Ἡλιάδες). The daughters of Helios and the oceanid Clymene. They made ready the sun-chariot for their brother Phaëthon without the command of Helios, and at his death were changed into poplars, while their tears became amber. Some accounts name three Heliades—Ægle, Phaëthusa, and Lampetie; others mention seven.

HE'LIÆ'A (Lat., from Gk. ἡλιαία, *hēliaia*). A higher court at Athens composed of 5000 citizens over thirty years of age chosen by lot annually. It was divided into ten sections, each of which constituted a court by itself. Its sessions were public.

HELIAND, hā'lê-änd (OS. *Hēliand*, Savior). A Saxon poem of the ninth century. The portion still preserved relates the life of Christ as told by the four Evangelists, whose various narratives the author seeks to harmonize. It is thought to have been composed by a Saxon writer of unknown name at the request of the Emperor Louis the Pious. Like all early Germanic poems, the *Heliand* is written in alliterative verse, in the use of which the author shows marked skill. Until the publication by Zangenmeister and Braune in 1894 of fragments of a Saxon paraphrase of Genesis, the *Heliand* was the only important monument of Saxon known to the present age. Apart from its great value to the student of language, the *Heliand* is of interest because of its spirited and sympathetic treatment of the Gospel narrative. The author shows himself to be no mere slavish transcriber, but a true poet. In accordance with the taste and knowledge of the age, scenes and incidents are strongly localized, the spirit of the whole work being Germanic rather than Christian. To modern readers the intense reality of the characterization often seems irreverent, suggesting the later treatment of biblical narratives in the religious drama; but the purpose of the poet is evidently earnest and extremely reverent. It is doubtful whether an historically correct treatment of the New Testament would have appealed to the primitive audience for whom the poem was composed. The most recent and the fullest edition of the *Heliand* is that of Piper, the first volume of which, containing the text, appeared in 1897. The latest German translation is by E. Behringer (Aschaffenburg, 1898).

HE'LIAN'THUS. See ARTICHOKE, JERUSALEM; SUNFLOWER.

HELIAS, HELIS, or **HELYAS,** hē'lê-äs. See SWAN, KNIGHT OF THE.

HELICE, hĕl'ĭ-sê (Lat., from Gk. Ἑλίκη, *Helikē*). (1) In Greek mythology, the daughter of Lycaon, beloved by Zeus and transformed by Hera into a bear. Zeus thereupon placed her in the heavens as the constellation of the Great Bear. (2) The daughter of Selinus and wife of Ion. She gave her name to the town of Helice, in Achæa.

HELICIDÆ, hê-lĭs'ĭ-dē (Neo-Lat. nom. pl., from Lat. *helix*, Gk. ἕλιξ, spiral). A large cosmopolitan family of terrestrial pulmonate gastropod mollusks, the land-snails. They have a part of the mantle-cavity formed into an air-breathing organ, or lung, and the shell coiled. See SNAIL.

HELICOCERAS, hĕl'ĭ-kŏs'ĕr-as (Neo-Lat., from Gk. ἕλιξ, *helix*, spiral + κέρας, *keras*, horn). A curious fossil ammonoid shell found in Cretaceous rocks of Europe, Asia, and America, characterized by the looseness of the turreted shell, the last coil of which is of irregular curvature. It is one of the peculiar aberrant forms evolved in the last stages of a race that began in Jurassic time with closely wound discoid shells of the normal ammonoid form. See AMMONOIDEA; CEPHALOPODA.

HEL'ICON (Lat., from Gk. Ἑλικών, *Helikōn*). A mountain, or rather a mountain range, in the southwest of Bœotia, in Greece, forming a continuation of the range of Parnassus. The loftiest summit (now called Palæovouno) is 5738 feet high. At the foot of Helicon stood the village of Ascra, now Pyrgaki, the native place of Hesiod (q.v.), and the seat of an early school of didactic epic. The mountain was the seat of a very ancient worship of the Muses, and with this is probably to be connected the poetic school at Ascra. The grove of the Muses was at the northern foot of Helicon, in a valley near the Monastery of Saint Nicholas; higher up the mountain (20 stadia according to Pausanias) was the fountain of Hippocrene (q.v.), probably the modern Kryopegadi or cold spring. Near Ascra was the celebrated fountain of Aganippe.

HELICON (Gk. ἑλικών, *helikōn*, musical instrument with nine strings, from ἕλιξ, *helix*, spiral, from ἑλίσσειν, *helissein*, to turn; connected with Lat. *volvere*, to turn, Eng. *wallow*). (1) An ancient stringed instrument for illustrating the theory of musical intervals. (2) The lowest of all brass instruments. It is constructed in various pitches (F, E♭, C, B♭) and has much the quality and range of the bass tubas. The

helicon is built in the form of a circle and carried around the body. For this reason it is generally used in military bands in preference to the tuba, because it can be carried with less effort when marching.

HELICON'IDÆ. A family of butterflies noted in the study of mimicry. See MIMICRY.

HE'LIOCEN'TRIC (from Gk. ἥλιος, *hēlios*, sun + κέντρον, *kentron*, centre). A term in astronomy, signifying that the sun is taken as the centre of reference or view. It is opposed to geocentric (q.v.), which indicates that the earth is taken for centre.

HEL'IODO'RUS (Lat., from Gk. Ἡλιόδωρος). A Greek romance-writer, born at Emesa, in Syria. He flourished, probably, at the end of the third century A.D., and is not to be confused with Heliodorus, the Bishop of Trikka in Thessaly, who, according to the Church historian Socrates, wrote a romance in his youth. His work, in ten books, entitled *Æthiopica* (Αἰθιοπικά), narrates the loves of Theagenes and Charicleia. At times the work shows almost epic beauty and simplicity. The descriptions are excellent, and the interest of the reader is in general well maintained; but in the presentation of the emotions the work is far less successful. The language betrays the Semitic origin of the author, and the style shows his rhetorical training and adherence to the Neo-Pythagorean School. Heliodorus was strongly influenced by Homer and Euripides, and in his turn has been a favorite model of many French dramatists—for example, of Racine (q.v.). There are editions by Bekker (Leipzig, 1855), and Hirschig (Paris, 1856); English translations by Rowland Smith (London, 1855) and Underdowne (1857; last printed London, 1895). Consult Rhode, *Der griechische Roman* (Leipzig, 1900).

HE'LIODO'RUS, treasurer of Seleucus IV. of Syria (B.C. 187-175). Seleucus sent him to Jerusalem to rob the temple, but he was refused admittance by Onias, the high priest, on the first day, and on the next was driven away, according to the story (II. Macc. iii.), by a terrible angel. He murdered his master and usurped the throne, from which he was driven by Attalus and Eumenes, princes of Pergamus, after a few months.

HE'LIOGAB'ALUS. See ELAGABALUS.

HELIOGRAPH (from Gk. ἥλιος, *hēlios*, sun + γραφία, *graphia*, writing, from γράφειν, *graphein*, to write). An instrument used for communication between distant stations by reflections of the sun from a mirror or system of mirrors. The great advantage of this method over the ordinary signal system is that the apparatus is more portable and can be used over greater distances, but only with success in regions where the atmosphere is clear of clouds for considerable periods of time. There are two methods of using the heliograph, which are based in the main on the dot and dash: the reflection may be obscured except when the screen is temporarily removed to produce a flash or letter; or the reflection may be kept exposed except when it is obscured to produce a letter. The first method is said to be the easier for the beginner, but the second less fatiguing to the eye. The distance through which this mode of communication may be carried on varies with the size of the mirrors and the clearness of the atmosphere. In 1890 messages were signaled along the Arizona mountains for 215 miles. When the signaling station forms an angle greater than a right angle between the sun and the receiving station, two mirrors are used to prevent too great a loss of rays by oblique reflection. The mirrors are mounted on tripods, and are held by a socket, or a universal joint. Besides its use as a signaling instrument, the heliograph has served to define distant points in a geodetic survey, and for this purpose has been employed in triangulation. Perhaps the chief use of the heliograph is in military operations in the field. It formed the sole means of communication between the besieged British garrisons and the relief columns during the Boer-British War.

HELIOGRAPHY. See PHOTOGRAPHY.

HELIOLITES, hē'lī-ō-lī'tēz (Neo-Lat., from Gk. ἥλιος, *hēlios*, sun + λίθος, *lithos*, stone). A genus of fossil alcyonarian corals found in Ordovician and Silurian rocks and less abundantly in the Devonian formations. Heliolites is the type of an important family, Heliolitidæ, comprising about 10 genera and 45 species. All the members of the family have rounded coral masses that consist of larger tubes surrounded by smaller tubes. The genera and species are based upon modifications of the horizontal and vertical walls that traverse the interior of the mass. They have been found in all countries where Silurian and Lower Devonian formations exist and they often form fossil coral reefs of considerable extent. Heliolites interstinctus, the best-known species, is of world-wide distribution. Consult Lindström, "Remarks on the Heliolitida," in *Kongliga Svenska Vetenskaps-Akademiens Handlingar*, vol. xxxii. (Stockholm, 1899). See CORAL; OCTOCORALLA.

HE'LIOM'ETER (from Gk. ἥλιος, *hēlios*, sun + μέτρον, *metron*, measure). An instrument originally intended for measuring the angular diameter of the sun. It is a telescope in which the object-lens is in two halves, each of which will form a perfect image in the focus of the eyepiece; and the images may be made to diverge, coincide, or overlap each other by varying the distance between the half-lenses. If the diameter of the sun is to be measured, the two lenses are adjusted so that the images will touch each other, then the distance between the centres of the two object-glasses measured in seconds gives the diameter of the sun. Fraunhofer made many remarkable improvements in the heliometer, but the perfected type of instrument as used to-day is the work of A. Repsold & Sons of Hamburg. The original use of the heliometer has been greatly extended, especially in the hands of Gill at the Cape of Good Hope Observatory. As now made, angular distances above two degrees can be measured on the sky with extreme precision. On the whole, the modern heliometer is considered the most precise measuring instrument known to astronomy.

HE'LIOPHYL'LUM (Neo-Lat., from Gk. ἥλιος, *hēlios*, sun + φύλλον, *phyllon*, leaf). A fossil coral very common in the Hamilton shales of central and western New York and other localities in America. This coral is usually simple, of conical form, with a large shallow cup in which a great number of slender septa or walls radiate from the centre toward the elevated edge.

Perfect specimens, which are quite common, are really beautiful objects. Sometimes the coral branches, and then two or more cups or calyces are found on the same stem. Heliophyllum Halli is the common species.

HE'LIOP'OLIS (Lat., from Gk. Ἡλίου πόλις, *Hēliou polis*, City of the Sun). The Greek name of the ancient Egyptian city On, situated on the east side of the Pelusiac branch of the Nile near the apex of the delta. Its site is occupied by the modern village of Matariah. Heliopolis was the seat of worship of the god Tum or Atum, who later came to be regarded as one of the forms of the sun-god Rē. Its sacred name was Per-Rē, 'house or city of Rē,' and of this the Greek name is a translation, as was also the Hebrew name *Bethshemesh*. As On, it is often mentioned in the Bible. Although a very ancient and important city—according to Manetho, it existed in the time of the Second Dynasty—it is seldom mentioned in Egyptian texts before the Twelfth Dynasty. Amenemhat I. built here a splendid temple, on the site of an older sanctuary, and his son and successor, Usertesen I., erected before it two great obelisks, of which one is still standing. The obelisks known as Cleopatra's Needles, of which one is now in New York and the other in London, were originally erected at Heliopolis by Thothmes III. Under Rameses III. (about B.C. 1200) the temple was at the height of its influence, standing second only to that of Amon at Thebes; 12,693 persons are said to have been engaged in its service. The theological school of Heliopolis had a strong influence upon Egyptian religious thought, and to it is due a very considerable portion of the religious literature of ancient Egypt. Greek writers mention the great reputation for wisdom enjoyed by the Heliopolitan priests, and Thales, Solon, and Plato are said to have studied under them. Under the later dynasties Heliopolis seems to have declined, since Herodotus speaks only of the wisdom of its priests, not of the splendor of its buildings; and Strabo, at the beginning of the Christian Era, states that the place was practically deserted, though the temple and college still existed. The ruins of the city and temple existed in a fair state of preservation far down into Arab times, but now little remains except the obelisk of Usertesen I.

HELIOPOLIS (in Syria). See BAALBEK.

HE'LIOS (Gk. Ἥλιος, or in the epic Ἠέλιος, *Eelios;* connected with Lat. *sol*, Goth. *sauil*, AS., Icel. *sōl*, Ir. *sul*, Lith., Lett., OPruss. *saule*, Skt. *sūra, svar*, sun). The Greek name of the sun-god. He was, according to the *Theogony*, a son of the Titan Hyperion and of Thea or Euryphaëssa, and is described by the same poet as giving light to both gods and men. He rose in the east from the marshy borders of Oceanus, into whose dark abysses he also sank at evening. The later poets, however, gave him a splendid palace in the east, somewhere beyond Colchis, and described him as being conveyed, after the termination of the burning labors of the day, in a winged boat of gold, along the northern coasts of the sea back to Colchis. In the earlier poets Helios is a distinct personality, all-seeing, the possessor of herds on Trinacria, a powerful deity. Later, much of his personality is obscured, and the real sun-god becomes Apollo, probably because the word Helios, denoting the actual sun, was not felt so fully as a proper name. Euripides contributes much to this fusion. His worship was widely spread. He had temples in Corinth, Argos, Trœzene, Elis, and many other cities; but his principal seat was Rhodes, where four white horses were annually sacrificed to him. A similar sacrifice was offered in his honor on the summit of Mount Taygetus in Laconia. In art, he was represented as a young man in the full vigor of his strength and beauty, with flowing hair, and a crown of rays. Often he was represented in his four-horse chariot, as in a celebrated group by Lysippus at Rhodes.

HE'LIOSTAT. An instrument used in astronomy, physics, and engineering to reflect the light from the sun or other luminous body in a certain desired direction. It consists of a mirror so mounted that it is capable of being moved by clockwork in such a direction and with such velocity that it will reflect the light of the sun to the same point independent of its motion. The first instrument of this kind is described by s'Gravesande (1688-1742) in his *Physices Elementa* (3d ed. 1742). The heliostat is used with the spectroscope (q.v.), where it is desired to keep the sun's rays on the slit or in connection with a permanently mounted telescope, such as that constructed for the Paris Exposition of 1900. So large a telescope (see TELESCOPE) it would have been next to impossible to mount equatorially, and it was necessary to reflect the light from the heavenly objects under observation into its object-glass. The heliostat has also been used for observing eclipses, especially where it is desired to photograph the eclipse or make extensive spectroscopic observations. The term heliostat is also used to name an instrument which is more usually known as the *heliotrope*, used by surveyors and engineers in making long-distance observations for distant stations. This consists of a mirror at the distant station which is so mounted and adjusted that it will reflect a beam of light to the observing station. (See ENGINEERING INSTRUMENTS.) The heliostat of Thomas Drummond was an instrument of this kind, and was employed in geodetic surveying in England with considerable success.

HE'LIOTAX'IS (Neo-Lat., from Gk. ἥλιος, *hēlios*, sun + τάξις, *taxis*, arrangement). Same as phototaxis (q.v.). See, also, HELIOTROPISM.

HE'LIOTROPE. See ENGINEERING INSTRUMENTS.

HELIOTROPE (from Lat. *heliotropum*, Gk. ἡλιοτρόπιον, *hēliotropion*, heliotrope, sun-dial, from ἥλιος, *hēlios*, sun + τροπή, *tropē*, a turning, from τρέπειν, *trepein*, to turn), *Heliotropium*. A genus of plants of the natural order Boraginaceæ (q.v.). Many of the species have fragrant flowers which are used by perfumers. The Peruvian heliotrope (*Heliotropium Peruvianum*), a small shrub, seldom more than two feet high, with oblong-lanceolate wrinkled leaves and small lilac-blue flowers, is in almost universal cultivation for its fragrance, which resembles that of vanilla. The European or common heliotrope (*Heliotropium Europæum*), a native of the south and west of Europe, is an annual with small white, or rarely pale-red, flowers. A white flowered species (*Heliotropium curassavicum*) grows wild in the Southern United States. *Heliotropium co-*

rymbosum is a large-trussed, large-flowered, narcissus-scented species. Many hybrid heliotropes are now to be seen in flower-gardens and greenhouses, which exhibit great variety in the size

HELIOTROPE.

and color of their flowers. They delight in a light, rich soil. The shrubby kinds are generally propagated by cuttings.

HELIOTROPE, or BLOODSTONE. A variety of chalcedony that is of a green color, with small spots of red jasper. It is found in Siberia, in the Hebrides on the west coast of Scotland, and in the United States—in Chatham County, Ga., Orange County, N. Y., and at various localities in Oregon and Colorado. It was known to the ancients, who valued it for gem purposes. During the early ages of the Christian Church it was used for the engraving of sacred subjects, the figures being so arranged that the red spots were made to represent drops of blood. It is still frequently used as a seal.

HE'LIOT'ROPISM, or **PHOTOT'ROPISM** (from Gk. ἥλιος, *hēlios*, sun + τροπή, *tropē*, a turning). The sensitiveness of plant organs to the direction of light-rays incident upon them.

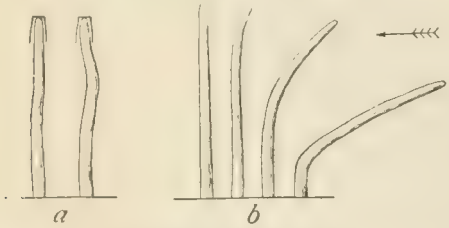


FIG. 1. POSITIVE HELIOTROPISM.

Seedlings of oats grown in darkness: *a*, two exposed to light from direction of arrow, but with sensitive tips capped with tin foil; *b*, four, whose tips were not shaded, sketched at intervals as the bending toward the light increased. Growth is accelerated on the side less illuminated.

The organ responds to lateral illumination by bending in such a way as to bring its axis into a certain fixed position with reference to the direction of the rays of light. The main shoots of most higher plants are positively heliotropic—i.e. they bend so as to direct their axes toward the source of illumination (Fig. 1). Thus, whenever plants are grown in front of a window, the stems bend toward the light. Some organs are negatively heliotropic. This is seen best in the case of certain roots (especially those of plants belonging to the mustard family) when grown in water. If such roots are laterally illuminated after having been grown in the dark, they bend away from the light.

Another mode of response to the stimulus of one-sided illumination is known as 'diaheliotropism.' Most leaves are diaheliotropic; they bend so as to bring their blades into a plane at right angles to the direction of the incident rays, the normally upper side of the leaf always facing the light (Fig. 2). This reaction is well shown by many house plants, such as the geranium (Pelargonium), when subjected to one-sided lighting. The form of heliotropic response may be very different when the intensity of the illumination varies. Many leaves, when exposed to a light of medium intensity, are diaheliotropic; but when the intensity of the light increases beyond a certain limit, they bend so as to direct their tips either toward or away from the source of the stimulating rays. They thus present less surface for the light to fall upon. Oxalis leaves show this response on bright summer days. The leaflets fold along the midrib and drop downward as though wilted. Clover (Trifolium), the sensitive plant (Mimosa), cassia, the bean (Phaseolus), and many

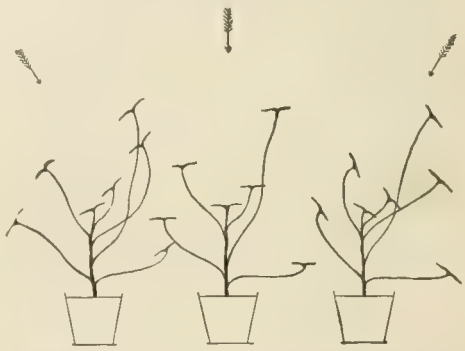


FIG. 2. TRANSVERSE HELIOTROPISM OF LEAVES.

Diagrams showing the plane of the leaves of tropæolum with light successively from the direction of the arrows.

others exhibit this phenomenon also. The final position assumed by any plant organ is never due, in nature, to the heliotropic response alone, but results from the combined action of many factors, of which light and gravity are the most important. See PHYSIOLOGY OF PLANTS.

HE'LIOZO'A (Neo-Lat. nom. pl., from Gk. ἥλιος, *hēlios*, sun + ζῷον, *zōon*, animal). An order of rhizopods, comprising forms naked, or clothed with a siliceous skeleton, and with fine, more or less stiff pseudopodia radiating from all sides. Contraction vacuoles are generally present. They are fresh-water forms, and are frequently called 'sun-animalcules.' They are sometimes supplied with a stalk, and occasionally form colonies, but many of them are free-swimming. They take their food into the body by means of the currents of protoplasm on the

pseudopodia. A widespread and familiar species is *Actinophrus sol.*

HE'LIUM (Neo-Lat., from Gk. ἥλιος, *hēlios*, sun). A gaseous element, first isolated by William Ramsay in 1895. Lockyer discovered it, spectroscopically, in the solar chromosphere as far back as 1868. Ramsay obtained it originally by heating the Norwegian mineral clevite; but it has since been found in other uranium minerals, in mineral waters, in meteorites, and in small quantities in atmospheric air. Helium (symbol He, atomic weight 3.96) is a colorless gas scarcely twice as heavy as hydrogen. It was liquefied in 1898. Like argon, it shows a disinclination to enter into chemical union, and therefore its compounds have not been studied. Its molecules, like those of argon, are assumed to be made up of single atoms. Its spectrum has been examined by Sir William Crookes, who found the line D_3, which corresponds to the yellow double line observed in the spectrum of the solar chromosphere by Lockyer.

HE'LIX (Lat., from Gk. ἕλιξ, spiral). (1) In architecture, a spiral form, as when a flight of steps winds round a cylindrical space or centre post. The name is also given to the little volutes under the flowers of the Corinthian capital. The *helical* line is the central line of such a helix or spiral, and corresponds to the *axis* of the usual rectangular constructions. (2) A genus of land-snails. Fossil forms are often found in great abundance in both the fresh-water and marine limestones and marls of Tertiary age in America, Europe, Asia, and Africa.

HELL (Icel. *hel*, AS. *hel*, *hell*, OHG. *hella*, Ger. *Hölle;* probably connected with AS., OHG. *helan*, Ger. *hehlen*, to cover, and ultimately with Lat. *celare*, Gk. καλύπτειν, *kalyptein*, to hide, OIr. *celim*, I hide; hence, the hidden, unseen place). In common use, the place or state of the wicked after death, or the abode of evil spirits. Among the early Teutons the term signified the place under the earth whither all men, good or bad, went after death, and consequently denoted a conception similar to the Semitic Sheol (q.v.). There is evidence, however, that already before contact with Christianity this nether world was divided into distinct parts. Thus in the realm over which the goddess Hel rules there is the blessed place where Balder and Nanna dwell, and also Lif and Lifthraser, who are to become parents of a new and better human race; and there is Nastrand, where the monster Nidhögg feeds upon the bodies of murderers, perjurers, and adulterers. How strongly intrenched the original meaning was is evident from the fact that the early translators of the Bible did not hesitate to use the word as a rendering of Sheol, the pit, or the grave, even in passages where good men are said to descend into these places. Modern translators generally restrict the word to those cases where the original has Gehenna (q.v.) or Tartarus, in harmony with the significance that the term has gradually attained. The Greek conception of Hades, or the unseen world, as seen in the Homeric poems, is substantially the same as that of the early Teuton. To the animistic origin of the idea the Mycenæan tombs bear testimony. Whatever native tendencies there may have been in the direction of a moral distinction and a differing lot among the shades in Hades, they were greatly strengthened in the seventh and sixth centuries B.C. by the establishment upon Grecian soil of the originally Thracian Orphic cult societies. Those initiated in the Orphic mysteries secured for themselves a blessed immortality, while the uninitiated were liable to severe punishment for their sins in Hades. In a society where the *lex talionis* prevailed, it is natural that the punishment conceived to be inflicted upon men in a future world should be related to the crimes committed, and Greek imagination nicely adjusted the penalty to the sin. Through Pythagoras of Samos in the sixth century B.C., the idea of a transmigration of souls and the necessity of expiating the sins of a past age grafted itself upon the Orphic conceptions. With the expansion of Greek civilization through the conquests of Alexander, Orphic and Pythagorean speculation spread in the East, modifying or transforming many native ideas. As in other Semitic nations, so in ancient Israel, the shadowy existence in Sheol was in marked contrast with existence in the land of the living and could not be called life at all. In Sheol there were no moral distinctions and no rewards for virtue or punishments for crimes. "The wicked ceased from troubling and the weary were at rest." This attitude toward the future was preserved throughout the Old Testament. There is not a single passage in which Sheol is represented as a place where the wicked are punished. When for the first time the idea of a resurrection is found in the Book of Daniel (written B.C. 165), the tyrants that are raised to obloquy and shame, as well as the martyrs that rise to life and glory, undoubtedly continue their existence on earth. In an addition to the last chapter of the Book of Isaiah, probably made in the second century B.C. (lxvi. 23, 24), it is predicted that the pious Jews who visit the temple in Jerusalem on Sabbaths and other holidays will go out to look with pleasure upon the carcasses of the enemies that are being consumed by fire and worms. Probably the Valley of Hinnom (q.v.) is meant. It is significant that this place of punishment has not yet been transferred to the unseen world. There was no allusion to this passage in the original text of Ecclus. vii. 17, where the Hebrew has only "the hope of man is the worm." But substantially the same conception of the Valley of Hinnom is found in Enoch xxvii. 2, 3, and xc. 24-26. While the growth of the doctrine of Gehenna can be explained from national premises (see HINNOM), the transformation of a Sheol without wide distinctions into a hell where the wicked are punished, seen for the first time in Enoch xxii., can scarcely be accounted for without resorting to Greek influence. In this place of punishment some sinners remain, according to the author, even after the general judgment, being neither slain nor raised. In the Slavonic Enoch, the prison of the apostate angels is in the second heaven (vii.), and the place of the damned in the northern part of the third heaven (x.); and in the Testaments of the Twelve Patriarchs, the spirits of the lawless are confined in the second heaven. In the Wisdom of Solomon, iii. 10, 14; iv. 10, 19, Hades is practically identical with Gehenna, since the author does not believe in a resurrection. The influence of Orphic-Pythagorean thought is particularly evident in the fullest description of hell preserved from the early Church, the Apocalypse of Peter, where the different punishments are carefully adjusted to

the different kinds of sin. Among early Christian writers, the word hell is variously employed, sometimes to signify a place of temporary purgation, in which sense it comprehends the Roman Catholic purgatory; sometimes the place (*limbus patrum*) in which the souls of the just of the old law awaited the coming of Christ, who was to complete their felicity; sometimes the place in which unbaptized children are believed to be detained, on account of the stain of unremitted original sin; and lastly, the prison of those who die stained with the personal guilt of grievous sin. As to the nature of the punishment to which they are subjected, whether it is confined to the 'pain of loss'—that is, to the remorseful consciousness of having forfeited the presence of God and the happiness of heaven—or whether and to what degree it further includes the 'pain of sense,' there is some difference between the Eastern and the Western churches, and it is sometimes alleged that the Eastern Church altogether rejects the idea of punishment of sense. This, however, is a mistake; both churches agree that the punishment of hell includes the 'pain of sense,' the controversy between them having regarded not the existence of the pain of sense, but certain questions as to its nature, and especially whether it consists of material fire, a point which, in the decree for the union of the Greek and Latin churches at the Council of Florence, was left undecided. The controversy on the subject of the eternity of the punishment of hell dates from an early period, Origen and his school having taught that the punishment was but purgatorial in its object; that its purifying effect having once been attained, the punishment would cease for all, even for the devils themselves; and that its duration in each case is proportioned to the guilt of the individual. This doctrine of the final restoration of all to the enjoyment of happiness was the well-known Origenistic theory of the *apocatastasis*, to which so many of the early writers refer. It was condemned by the second council of Constantinople, and a belief in the eternity of the punishments in hell became characteristic of both the Eastern and the Western churches, and from them passed into the creeds of the churches of the Reformation. The more radical thinkers of the Renaissance period rejected the doctrine of hell, and especially many Baptist and Anti-Trinitarian churches. In modern times the belief in physical punishment after death has been abandoned by certain Protestants, and the endless duration of this punishment is rejected by many, either on the ground of a future acceptance of Christ after a punishment commensurate with the offenses committed during a brief lifetime, or for reasons connected with their general interpretation of life. Consult: Söderblom, *La vie future* (Paris, 1901); Dieterich, *Nekuia* (Leipzig, 1893); Charles, *Eschatology* (London, 1899); Bautz, *Die Hölle* (Mayence, 1882); Passaglia, *De Æternitate pœnarum deque Igne Inferno* (Regensburg, 1854). See ESCHATOLOGY; HEAVEN; INTERMEDIATE STATE; JUDGMENT, FINAL.

HEL'LA. A town in Asiatic Turkey. See HILLAH.

HEL'LADOTHE'RIUM (Neo-Lat., from Gk. Ἑλλάς, *Hellas*, Greece + θηρίον, *thērion*, diminutive of θήρ, *thēr*, wild beast). A fossil giraffe with hornless skull and legs of nearly equal length, skeletons of which have been found in the Pliocene deposits of Europe, Persia, and India. See GIRAFFE.

HELLAN'ICUS (Lat., from Gk. Ἑλλάνικος, *Hellanikos*) (c.496-c.406 B.C.). A Greek logographer (q.v.) of the fifth century B.C., born at Miletus. Although a contemporary of Herodotus, Hellanicus's attitude was essentially that of the older Ionian logographers, rather than that of the historian. He traveled extensively, and the titles of his works show that he had an intimate knowledge of many parts of Greece. He wrote a chronicle based upon the records of the priestesses of Hera at Argos (Ἱέρειαι αἱ ἐν Ἄργει), and another based on the lists of victors at the Carneian games (Καρνεονῖκαι). He also composed special histories of a number of districts in Greece, such as the Ἀτθίς (history of Attica), Φορωνίς (history of Argos), Ἀσωπίς (history of Bœotia), *Arcadica*, *Æolica*, *Lesbica*, etc., as well as accounts of special events, such as the Trojan War (Τρωϊκά) and the Persian invasion (Περσικά). He is blamed by Thucydides and subsequent historians for inaccuracy in his chronological statements, but there can be no doubt that his work was employed by Herodotus and later historical writers. All that is preserved of his writings is given in Müller, *Fragmenta Historicorum Græcorum* (Paris, 1841-70). Consult Koehler, *Leipziger Studien zur klassischen Philologie*, xviii. (Leipzig, 1898).

HEL'LAS (Lat., from Gk. Ἑλλάς). In the Epos, a district of southern Thessaly, near Phthiotis, with which it is sometimes identified. As the name Hellenes (Ἕλληνες, or, at first, Πανέλληνες) came to be applied to the whole Greek race, so the name Hellas was applied to the lands where the Greeks were settled, and in a more restricted sense to the mainland of Greece, especially the district north of the Peloponnesus. The Hellenes, or Greeks, seem to have received this name as a collective title with the growth of the legend that Hellen (q.v.), son of Deucalion, was the father of the race. Originally it must have meant only the inhabitants of the little district of Hellas.

HELLBENDER. A large, ugly-looking, but harmless salamander (*Cryptobranchus Alleghaniensis*), which occurs in Ohio, Pennsylvania, Tennessee, and southward. It is also commonly known as 'alligator' and 'water-dog.' It is voracious, and feeds on crayfish, fish, and other water animals, and readily takes the bait from the fisherman's hook. It exudes much slime, and is consequently difficult to handle. It is tenacious of life, and can live for hours out of water. The spawn much resembles that of frogs, but is lighter in color. It may reach a length of about twenty inches.

HELLE, hĕl'lē (Lat., from Gk. Ἕλλη). In Greek mythology, a daughter of Athamas, King of Orchomenus in Bœotia, and the goddess Nephele ('a cloud'). When Athamas married Ino, daughter of Cadmus, Nephele punished the land by a drought. Ino plotted the sacrifice of Phrixus, brother of Helle, but Nephele rescued her children by giving them the ram with the golden fleece, on which they escaped over the sea to Colchis. While passing through the strait between Asia and Europe, Helle fell from the ram and was drowned. The strait was called Hellespont, or sea of Helle, in her honor.

HEL'LEBORE (Lat. *helleborus, elleborus,* from Gk. ἐλλέβορος, ἐλλέβορος). A name applied to a number of plants of different genera, but properly to the species of Helleborus, a genus which belongs to the order Ranunculaceæ, and which contains about a dozen species, most of which are natives of Europe. The species are perennial herbs, with short rootstocks and few stem-leaves; the leaves are deeply divided, and the flowers terminal. One of the best-known species is the black hellebore (*Helleborus niger*), which has evergreen leaves, and is so called from its black rootstock. Its flowers, which are white or tinged with red, appear very early in the season; in England, frequently during the winter, on which account it is called Christmas rose. The leaves and flower-stalks arise from the rootstock. In former times this plant was reputed as efficacious in the treatment of insanity, but it is little used at present. It has some medicinal properties, but in over-doses is an acrid poison. A second species, common in Europe, is the stinking hellebore (*Helleborus fœtidus*), which grows upon hills in England and elsewhere, has leafy stems, and greenish flowers tinged with purple. It is noted for its disagreeable smell. Green hellebore (*Helleborus viridis*), which has large, greenish-yellow flowers, is another common European species. It has escaped from cultivation in the eastern part of the United States. *Helleborus orientalis* is the species known to the ancients. To it was first attributed the virtue of a specific for insanity. It is particularly abundant in Greece and the Levant, and was formerly very plentiful about Anticyra, where the best was obtained. Of these different species there are many horticultural varieties, some of which are beautiful. On account of their early

HELLEBORUS NIGER.

flowering, they are planted usually in shrubberies and borders. Closely allied to the above, and often called winter hellebore, is *Eranthis hyemalis*, the winter aconite, a native of Central Europe introduced into England, and sparingly escaped in the United States. This plant is employed in horticulture in the same way as the species of Helleborus. It has a single large yellow flower surrounded by an involucre of a single leaf.

A third plant, to which the name white hellebore is given, is *Veratrum album*. This genus belongs to the order Liliaceæ, or, according to some authorities, to the Melanthaceæ. White hellebore has a leafy stem, 3 to 4 feet high, and a long compound panicle of yellowish-white flowers. It is a native of Central and Southern Europe, and abounds in mountainous regions. The root of this plant is an active, acrid poison, and is used in medicine. In a powdered state it is an important insecticide, and is especially valuable for dusting over currant-bushes as a protection against the currant-worm. The American hellebore (*Veratrum viride*), also known as swamp hellebore, Indian poke, and itch weed, is a common plant in wet grounds from Canada to Alabama. Its properties are similar to those of white hellebore. A species commonly known as *Veratrum Californicum* is found from the Rocky Mountains to the Pacific Coast. Its properties are doubtless similar to those of the other species, and it is reputed to be the cause of considerable loss to stockmen through its being eaten by stock. The active principle seems in all of the species to be the alkaloid veratrine, or a substance similar to it. Some pharmacologists restrict the production of veratrine to the related Schœnocaulon officinale, and call the corresponding alkaloid of Veratrum viride veratroidine.

HELLEBORE. The president of a medical school, in Foote's *Devil upon Two Sticks*. The part is one of the incarnations assumed by the Devil, and was generally taken by the author himself.

HEL'LEN (Lat., from Gk. Ἕλλην). In Greek tradition, the son of Deucalion and Pyrrha, and father of Dorus, Æolus, and Xuthus; from Æolus were descended the Æolians, from Dorus the Dorians, while from the two sons of Xuthus, Ion and Achæus, came the Ionians and Achæans. From Hellen came the collective name of the Greeks, Hellenes. The whole story is relatively late, being unknown to the Homeric poems, where the Hellenes are a tribe of the Phthiotis, and is probably a creation of the eighth century B.C. or later, when the feeling of national unity developed among the Greeks, and the name Hellenes received its later meaning. We are told that Hesiod and Archilochus were the first to call the body of Greeks Hellenes.

HELLENES, hĕl'lēnz. The name applied by ethnologists to the earliest Greek-speaking Aryans, who on their arrival in the peninsula found the land already inhabited by the Pelasgians, the eastern division of Sergi's Mediterranean species. The Pelasgi, excepting a few scattered groups, became Hellenized, the heterogeneous elements being fused with a Hellenic nationality, built upon a Pelasgic substratum and possessed of Hellenic culture. See GREECE.

HELLEN'ICA (Lat., from Gk. Ἑλληνικά, *Hellēnika*, neu. pl. of Ἑλληνικός, *Hellēnikos*, relating to Greece, from Ἑλλάς, *Hellas*, Greece). An historical work in seven books by Xenophon, taking up the history of Greece from the point at which the history by Thucydides ends, and covering the forty-eight years prior to the battle of Mantinea. The work is trustworthy and the most important authority for the period covered, but suffers from incompleteness, failure to men-

tion momentous events, and the prejudice of the author.

HELLENIC STUDIES, Society for the Promotion of. An English society, organized in 1879 for the advancement of the study of the Greek language, literature, and art, and for the perpetuation of the history of the Greek race in the ancient, the Byzantine, and the Neo-Hellenic periods. It has devoted itself to the collections of drawings, facsimiles, transcripts, plans, and photographs of Greek inscriptions, works of art, ancient sites and remains, and to organizing means for the pursuit of archæological researches in countries which at any time have been the sites of Hellenic civilization. The society issues annually the *Journal of Hellenic Studies,* which contains the results of the researches prosecuted under its auspices. It has members in every quarter of the globe. Among those who were active in the work of organization were: J. S. Blackie, Sidney Colvin, J. P. Mahaffy, A. H. Sayce, Sir Richard Jebb, Sir John Lubbock, and Hon. A. J. Balfour. The society has about 880 members, including foreign members in every quarter of the globe. The annual meeting of the society takes place in June.

HELLENIST (Gk. Ἑλληνιστής, *Hellēnistēs,* one who speaks Greek, from Ἑλληνίζειν, *Hellēnizein,* to speak or make Greek, from Ἕλλην, *Hellēn,* Greek, from Ἑλλάς, *Hellas,* Greece). In biblical and Jewish history, a Jew distinguished by the adoption or affectation of Greek thought, manner, or language. The word is found in the Bible only in Acts vi. 1; ix. 29; xi. 20 (cf. the Revised Version, margin), and in the last two of these passages the Codex Alexandrinus reads not Hellenist, but Greek (*Hellēn*). The latter term occurs rather frequently in the Greek version, chiefly in the Books of the Maccabees, the writings of Paul, and the Acts. There is little reference to the Greeks in Jewish literature prior to the time of Alexander the Great and his successors. Indeed, apart from the Wisdom of Solomon and Fourth Maccabees in the Greek Old Testament, and in the Epistle to the Hebrews, the Fourth Gospel, Second Peter, and to a lesser degree in Paul, in the New Testament, Greek thought did not essentially affect Judaism or primitive Christianity. The tone of the Bible is overwhelmingly Jewish, not Greek. Hellenism, which before the Maccabean revolt (c.150 B.C.) had stood to the Jew for what is characteristic of Greek culture, stands after that time also for what is anti-Jewish, Gentile, heathen. As the Greeks had divided the world into Greeks and barbarians, so now the Jews divided the world into Jews and Greeks. The term Greek (*Hellēn*) came to be used by the Jew not only specifically of Greeks as opposed to other nations (II. Mac. xi. 2; Rom. i. 16), but also generally of 'foreigners' (II. Mac. xi. 24; Gal. ii. 3); while Hellenist (*Hellēnistēs*) seems to refer now to Greek-speaking Jews (Acts vi. 1; ix. 29), now to Greeks as such in contrast with Jews (Acts xi. 19, 20, Codex Vaticanus). The reading of the Codex Alexandrinus in ix. 29 and xi. 20 is *Greeks,* not *Hellenists*—a reading which suggests that the terms are interchangeable, the context alone determining the nationality. Indeed, *Hellēn,* in the Fourth Gospel, may, like *Hellenist* in Acts vi. 1, ix. 29, refer not to Greeks as such, but to Greek-speaking Jews. See Jews; and for the Hellenistic Greek dialect, see Bible.

HELLER, hĕl′lĕr, Karl Bartholomäus (1824-80). An Austrian naturalist, born at Myslibořitz, Moravia, and long professor in the Theresianum at Vienna. He is best known for his attempt to classify the fauna of Central America in his *Reisen in Mexiko in den Jahren 1845-48* (1853).

HELLER, Stephen (1814-88). An Hungarian composer and pianist, born in Budapest. When only nine he performed so successfully in public that he was sent to Vienna to continue his studies. In 1827 he played in Vienna, and in 1829 began a concert tour through Europe with his father. At Augsburg the young pianist fell ill, and was adopted by a wealthy family, with whom he lived until 1838. He had meanwhile continued his musical studies, and upon going to Paris became an intimate friend of Chopin, Liszt, and Berlioz. As a pianist, Heller now became well known, but his compositions gained favor more slowly. They are characterized by a fresh, natural beauty, forceful treatment of themes, and exquisite melody. In the originality of his themes Heller far outranks Mendelssohn, with whom, however, he has much in common. His studies for the pianoforte are among the very best, and are in universal use. With the exception of two visits to London, Heller lived in Paris from the time of his first journey there in 1838 to his death. For his *Life,* consult Barbadette (Paris, 1876; Eng. trans. 1877).

HEL′LESPONT. See Dardanelles.

HELLEU, ȧ′lē′, Paul (1859—). A French dry-point artist, born at Vannes. He studied painting at the Ecole des Beaux-Arts, but became interested in dry point through James Tissot, who gave him his first instruction. He made this art his special study, and achieved a reputation for his poetical etchings, particularly his portraits of women and children. He works very quickly; often his plates have but a few lines, and there is an effect of improvisation about them that is characteristic and charming. Helleu is well known in the United States through special exhibitions.

HELLEVOETSLUIS, hĕl′le-vōōt-slois′. A fortified seaport of the Netherlands, situated on the southern coast of Voorne in the Province of South Holland (Map: Netherlands, C 3). It has a good harbor, an arsenal, shipyards, a naval school, and large artillery stores. Population, in 1900, 4299. Hellevoetsluis is noted as the place where William of Orange embarked for England in November, 1688.

HELL-FIRE CLUBS. The name given to certain associations in England, Ireland, and Scotland, formed of profligate persons of both sexes, which came into existence in the early part of the eighteenth century. Several were suppressed by royal proclamation in 1721.

HELL GATE. A passage, called by the Dutch settlers of New York Helle Gat, being that part of the East River between Long Island and Manhattan Island, also between Long Island and Ward's Island, and between Ward's Island and Manhattan Island. The reefs of rock in the main passage, some of which were islands at low

tide, caused with the rising and falling of the tide numerous whirlpools and eddies, which rendered navigation at times dangerous, always difficult, and for large ships impossible, although the depth in the tortuous channel might be sufficient. The East River receives the Sound tide from the east and the Sandy Hook tide from the south. The times as well as heights of these tides being different, additional force is imparted to these treacherous currents. It was claimed that one out of every fifty sailing vessels attempting to go through Hell Gate was more or less damaged by the rocks.

A survey was made in 1848 by Lieutenants Charles H. Davis and David Porter, of the United States Navy, and in their report they recommended the destruction by blasting of Pot Rock, Frying Pan, and Ways' Reef, which lie between Long Island and Ward's Island.

The first attempts at removing the obstructions in Hell Gate were made by M. Maillefert, with whom a contract was made by citizens of New York. He commenced work in August, 1851, and by surface blasting operated upon the most prominent surface of the rocks and reduced them to an average depth of about sixteen feet. Congress, in 1851, appropriated for the work $20,000 and placed it under the direction of Major Fraser. The method was by surface blasting, as had been practiced by M. Maillefert. The reefs in this channel are largely composed of a stratified gneiss, and the layers, being tipped up nearly perpendicular, were unevenly affected by the action of the water, the softer parts being worn away and the harder parts left in vertical sheets or points. In 1866 Gen. John Newton, of the United States Engineer Corps, was ordered to make a survey, and proposed the construction of a drilling scow which should be securely moored at the site of operations. The machine was constructed, and put into operation on Diamond Reef, near the mouth of the East River, in May, 1871. Coenties Reef was also operated on with this scow in alternation with the work on Diamond Reef. These operations proving satisfactory, the machine was taken to Hell Gate, where it was in operation nearly three years, and effected a great improvement in the channel.

The first really important engineering accomplishment was the removal by tunneling and blasting of Hallet's Point Reef, which extended from the Astoria shore into the East River. By means of diverging tunnels and transverse galleries the reef was thoroughly undermined and nitroglycerin in cans was introduced into a large number of holes drilled in the pillars supporting the roof and in the roof itself. After water was let into the mine the nitrogen was exploded and the reef was destroyed, the debris being removed by grappling and dredging, so that there was a depth of 26 feet at low water over the site of the reef. The explosion at Hallet's Point took place September 24th, 1876, and was followed by energetic prosecution of work on Flood Rock or Middle Reef, where similar tunnels were constructed. After over 21,000 feet of tunneling had been constructed and holes aggregating 113,102 feet had been drilled, 300,000 pounds of explosives were put into the holes, and water was let into the tunnel. The result of the explosion that took place October 10, 1885, and subsequent dredging, was to provide a channel of uniform depth of 26 feet through Hell Gate.

HELLGRAMMITE FLY, or HELLDEVIL. See CORYDALIS.

HELLIN, â-lyēn′. A district town of the Province of Albacete, Spain, situated 69 miles by rail from Murcia (Map: Spain, E 3). In its vicinity are sulphur springs and mines. The sulphur-mines have been worked since Roman times, and their exploitation is still the principal industry of the town. It is a market for agricultural products, and produces woolen textiles. Population, in 1900, 12,787.

HELL′MANN, GUSTAV JOHANN GEORG (1854—). A German meteorologist and geographer, born at Löwen, and educated at Göttingen. In 1879 he was made assistant, and in 1882 temporary head of the Meteorological Institute of Berlin. He was vice-president of the Berlin Geographical Society, and a director of the *Meteorologische Zeitschrift*. Besides his contributions to the latter, Hellmann's more important works are: *Repertorium der deutschen Meteorologie* (1883); *Meteorologische Volksbucher* (1891); *Das Klima von Berlin* (1891); *Schneekrystalle* (1893); *Regenkarte der Provinz Schlesien* (1899); *Regenkarte der Provinzen Ostpreussen, Westpreussen und Posen* (1900); *Regenkarte der Provinz Brandenburg und Pommern* (1901); and the series *Meteorologische Neudrucke* (1893-1900).

HELLMESBERGER, hĕl′mĕs-bĕrk′ĕr. A family of Austrian musicians whose founder, GEORG (1800-73), was a celebrated violin-teacher in Vienna. In 1829 he became conductor of the Imperial Opera, and in 1833 a professor at the Vienna Conservatory. He made several successful tours and composed considerable music for the violin. His two sons, GEORG, Jr. (1830-52), and JOSEPH (1829-93), were talented violinists. The former produced two operas, *Die Bürgschaft* and *Die beiden Königinnen*, and made a tour through Germany and England. Joseph was first violin of the 'Hellmesberger Quartet' (1849-87); violin professor at the conservatory (1851-77), and director (1851-93); concertmeister at the Imperial Opera (1860); and soloist in the Court orchestra (1863). His son JOSEPH (1855—) is the most important member of the family. He was second violin in his father's quartet, and in 1887 succeeded him as leader. In 1878 he became a professor at the Vienna Conservatory, and after having been a violinist in both the Imperial and Opera orchestras, was made leader in 1884, and kapellmeister in 1887 of the Court Opera. His compositions are wholly dramatic, and include six operettas, produced at Munich, Vienna, and Hamburg; numerous ballets; and some incidental music.

HELLMUTH, hĕl′mōōt, ISAAC (1820-1901). An English clergyman, born at Warsaw, Poland, of Jewish parentage. He was educated at Breslau, became converted to Christianity, and entered the Anglican ministry in Canada. He founded Huron College and other schools, and was Bishop of Huron from 1871 to 1883. He then went to England to become Assistant Bishop of Ripon. In 1885 he was made rector of Bridlington, and in 1891 chaplain at Holy Trinity, Pau. Among his published works are: *The Genuineness and Authenticity of the Pentateuch* (1867); and a *Biblical Thesaurus* (1884).

HELLQUIST, hël'kvist, Carl Gustaf (1851-90). A Swedish historical painter, born in Kungsör. He was a pupil of the Stockholm Academy, and studied under Lefebvre in Paris. He became professor at the Berlin Academy in 1886, and afterwards lived in Munich. His mannered historical pictures are usually of scenes from Swedish history. They include: "Disgraceful Entry of Sumanväder into Stockholm, 1526" (1878); "Sack of Wisby by Waldemar IV., 1361" (1882), both in National Museum, Stockholm; "The Death of Sten Sture" (1879); "The Embarkment of the Body of Gustavus Adolphus" (1885); and "Huss Going to the Stake" (1887).

HELLRIEGEL, hël'rê-gel, Hermann (1831-95). A noted German agricultural chemist, born at Mausitz, in Saxony. In 1857 he became director of the agricultural experiment station of Brandenburg and Niederlausitz at Dahme, from which he resigned in 1873, and in 1882 accepted a similar post at Bernberg, where he died. From 1873 to 1882 he was wanderlehrer at Bernberg. Among his many agricultural investigations with plants none rank in importance with his demonstration of the ability of leguminous plants to assimilate the free nitrogen of the air, and his discovery of the tubercles on the roots as the agency through which this takes place. The question of the ability of leguminous plants to use the nitrogen of the air had long been one of inquiry, and its settlement by him marked an epoch in the agricultural world. The important parts of these experiments he published in *Untersuchungen über die Stickstoffnahrung der Gramineen und Leguminosen* (Berlin, 1888), and *Ueber Stickstoffnahrung landwirtschaftlicher Kulturgewächse* (Vienna, 1890). See Leguminosæ. Consult Römer, *Hermann Hellriegel, Nachruf* (Leipzig, 1896).

HELLWALD, hël'vâlt, Ferdinand von (1843-84). An Austrian historian of literature, born in Vienna. In 1862 he was employed in the Imperial Library there, studied the North Germanic dialects and literatures, and was sent to the Netherlands by the library. He published (1866) the *Voyage au Maroc 1640-41* by the painter Adrian Mathan, and (1873) the second part of *Spieghel historiael* by Jakob von Maerlant, which he discovered in the library at Vienna, and other valuable works. His own writings are: *Vlämisches Leben, Geschichten und Bilder* (1867); *Geschichte des holländischen Theaters* (1874); and *Geschichte der niederländischen Litteratur*, completed and edited by Schneider (1887).

HELLWALD, Friedrich von (1842-92). An Austrian writer on geography and the history of civilization; brother of Ferdinand von Hellwald, and born at Padua. He entered the Austrian Army in 1858, and was lieutenant of cavalry (1866) in the war with Prussia; from 1871 to 1873 at Augsburg, then till 1882 at Cannstatt, he was editor of *Das Ausland*. His many works, which are more popular than scientific, include: *Maximilian I., Kaiser von Mexiko* (1869); *Kulturgeschichte in ihrer natürlichen Entwicklung bis zur Gegenwart* (4th ed. 1896-98); *Die Erde und ihre Völker* (4th ed. 1897); *Naturgeschichte des Menschen* (1883-84); *Amerika in Wort und Bild* (1883-85); *Frankreich in Wort und Bild* (1884-87); *Die menschliche Familie nach ihrer Entstehung und natürlichen Entwicklung* (1889); and the posthumous work, edited by Möller, *Kulturbilder* (1894).

HELM (AS. *helma*, Icel. *hjalma*, helm). The steering apparatus of a vessel. It consists of a rudder and tiller, and, in ships, of a steering wheel supplemented in large vessels by a steering engine. The rudder, which may be of either iron or wood, is the part of the apparatus which is in the water. Its shape is variable, but is usually nearly that of a rectangle, with rounded corners, and in old ships slopes upward at the top from the after edge toward the rudder-post, to which it is ordinarily pivoted along the forward edge. In many modern ships the rudder is more or less perfectly balanced as to pressure by having the rudder post or pivot nearly in the centre (but always somewhat nearer the forward edge); this reduces the power necessary to put it over and keep it there. The rudder is supported by *pintles* or arms bent at right angles and projecting from the rudder-post; by a skeg or shoe at the heel; and by a collar around the rudder-head. The tiller is the lever which works the rudder. It either passes through a slot in the rudder-head or fits over it, and consists of a straight bar of wood or steel; or in some ships it is replaced by a *quadrant*, which consists of a sector of a circle secured to its centre, which is the rudder post or head, and having chains attached to its corners and passing around its surface before leading to the wheel or engine. The *wheel* consists of one or more wheels, with eight to sixteen spokes projecting through the rims to form handles, and a barrel or axle around which the wheel-ropes are wound. One wheel-rope winds around its forward end in one direction and the other around the after end in the opposite direction; so that one unwinds as the other winds up, when the helm is put over to one side.

When steering engines are used, the rudder and tiller are large, or when it is desired to effect quick working of the rudder by affording extra power. The engines are operated by electric gear in the pilot-house or on the bridge, or by means of small wire ropes leading from the valve-gear of the engine to a wheel located in those places. In steering, the terms used to designate the position of the rudder, except in Germany, refer to the placing of the tiller. Thus, when the *helm* is *a-port* the tiller is pressed over toward the port side of the ship; similarly, we have the helm *amidships* and *a-starboard;* the helm is *a-lee* when the tiller is pressed over to the lee side, that is, the side away from the wind; the helm is *a-weather* when over toward the other side, and it is *hard a-port, hard a-starboard, hard a-lee*, etc., when it is pressed as far over as it will go in that direction. To *right* the helm is to put the tiller amidships; to *shift* it is to put it from one side to the other. To *ease* the helm is to let the tiller come more nearly amidships so as to ease the strain on the tiller. When a vessel is turning under control of the rudder, to *meet her* with the helm is to shift the helm and prevent her from turning any farther. *Nothing to starboard* (or port) is a direction to the helmsman cautioning him to steer as good a course as possible, but in any case not to run to starboard (or port) of the desired course.

Helmsman. In large ships without steering engines two or more men are necessarily stationed at the wheel; in sailing ships the man on the weather side is the helmsman, and the others

are assistants. In men-of-war a quartermaster is in charge of the steering; he keeps watch of the course, sees that the helmsman steers correctly, and tends to other matters, such as reading the barometer, thermometer, and hygrometer, and filling in the columns of the log every hour (if there is no junior officer).

HELM, hĕlm, Israel (c.1615-c.1695). A Swedish colonist in America. Probably a soldier in Sweden, he was one of the earliest settlers on the Delaware; lived at Passyunk (now Philadelphia), where he was collector of customs (1659); in 1668 became a member of Captain Carr's council, and was one of the number who received a grant of Calken Hook in the same year; and, about 1674, was justice 'for the river' and probably a member of the earlier Upland Court. Helm did much service as interpreter in conferences with the Indians, especially in 1675, in the meeting of the New Jersey Indians, Governor Andros, and the Swedish authorities at New Castle, Del. He is possibly to be identified with Israel Holms, an old Swede, on whose authority Rudman tells of the end of Peter Minuit.

HELMBOLD, hĕlm'bōlt, Ludwig (1532-98). A German theologian and hymnologist, born at Mühlhausen, Thuringia, and educated at Leipzig and Erfurt. At the latter university he taught (1554-86), but was finally forced out because of his bitter opposition to the Catholic members of the faculty. He went back to Mühlhausen, and became superintendent of the town. He was a skillful Latin versifier, and besides Latin hymns wrote spiritual songs in the vernacular, which won him the name 'the German Asaph'; among these mention should be made of: *Von Gott will ich nicht lassen; Du Friedefürst, Herr Jesu Christ;* and *Es stehn vor Gottes Throne.* For his biography, consult Thilo (Berlin, 1851).

HEL'MER, Nora. The heroine of Ibsen's drama of modern life, *A Doll's House.* She is, at the opening of the play, a thoughtless superficial creature, who is alternately petted and scolded by her narrow-minded husband, and thus becomes wholly unfitted to face or even comprehend life's realities. She impulsively commits a heinous crime, and only then discovers her own and her husband's actual natures. She escapes paying the legal penalty, but leaves her home with the determination to learn the truth regarding life, humanity, and herself.

HELMERS, hĕl'mērs, Jan Frederik (1767-1813). A Dutch poet, born at Amsterdam. His first work, a tragedy, was moderately successful, and he followed it by a poem, *Socrates* (1790). But his patriotic verses, published in 1810, and *The Dutch Nation* (1812), an heroic poem in six cantos, are what made his reputation. At a time when Holland was under French rule, these fiery patriotic poems revived the nation's enthusiasm. A posthumous volume of his poetry appeared in 1815.

HEL'MERSEN, Grégory Petrovitch (1803-85). A Russian geologist, born at Duckershof, in the Government of Livonia. He was educated at Dorpat and various German universities, from 1838 to 1863 was professor of geognosy and geology in the school of the mining engineer corps, and from 1865 to his retirement in 1872 director of the Mining Institute. He attained the military rank of lieutenant-general, and was a member of the Saint Petersburg Academy of Sciences. In 1829 he accompanied Alexander von Humboldt in the exploration of the lower courses of the rivers Volga and Ural. His chief published writings were his contributions to the extensive scientific work on the Russian Empire and the adjacent Asian countries, published by the Saint Petersburg Academy of Sciences, under the editorship of himself and Von Baer (26 vols., 1839-71).

HEL'MERT, Friedrich Robert (1843—). A German geodesist, born at Freiberg, Saxony. He was educated at the Polytechnic of Dresden and Leipzig University, in 1869-70 was observer in the Hamburg Observatory, and in 1870 became instructor in geodesy in the Technical College of Aix-la-Chapelle. In 1886 he was appointed director of the Royal Geodetic Institute of Prussia, and in 1887 professor of geodesy in Berlin University. In addition to numerous contributions to the *Astronomische Nachrichten,* the *Zeitschrift für Vermessungswesen,* and other technical periodicals, he published several volumes, including *Die Ausgleichungsrechnung nach der Methode der kleinsten Quadrate* (1872), and *Die mathematischen und physikalischen Theorien der höhern Geodäsie* (1880-84).

HELMET (diminutive of *helm,* Goth. *hilms,* OHG. *helm,* Ger. *Helm,* helmet; connected ultimately with Skt. *śarman,* protection, AS., OHG. *helan,* Ger. *hehlen,* Lat. *celare,* Gk. καλύπτειν, *kalyptein,* to hide, OIr. *celim,* I hide). A covering wholly, or in part, of metal, used in warfare to protect the head. Such protections have been used from the earliest times, and have been made in many different forms. The simplest form is in the shape of a close-fitting skull-cap. Such helmets are represented on the Assyrian monuments. They were of metal, and sometimes were provided with a defense for the neck. A tendency toward decoration is shown in some of the bas-reliefs, where warriors are represented with elevated helmets terminating in a point. The Greeks of the Homeric age are occasionally described as wearing very elaborate helmets. In the *Iliad,* Agamemnon places on his brow a lofty helm, four-crested, double-peaked, with horsehair plumes. At a later period the Greeks used helmets of different shapes, usually with protections for the face and neck, and sometimes surmounted by figures of birds or animals. Many of these were richly decorated. The Etruscans wore bell-shaped helmets, which often had projecting pieces like wings, which gave them a very peculiar appearance. The Romans ordinarily used a plain, undecorated skull-cap, strengthened by cross-bands of iron, and with a neck-guard. On the march this helmet was removed and carried slung from the right shoulder. Under the later Empire the Greek fashion of helmet became common. The Anglo-Saxons appear to have used a skull-cap with a figure of a boar on top. The Franks, on the contrary, used no protection for the head. But under Charles the Great the Imperial household guards wore helmets of a triangular shape, surmounted by conventionalized scrollwork or foliage. In the Bayeux tapestry the warriors wear conical helmets, with a straight piece descending in front to protect the nose. The most characteristic helmet of the Middle Ages, which was in vogue from the twelfth to the fourteenth century, was cylindrical in form and covered the head and a part of the neck. There were round openings

through which the warrior could see and breathe. It was so heavy that it was put on only at the moment of combat, and only when the knight fought on horseback. It was a very effective defense against a cut from a mediæval weapon, but no protection against bruises. In great contrast with this was the headpiece worn by the Saracens, with whom the Crusaders came into contact. They used light globular helmets of iron, richly ornamented and adorned with plumes. In the fourteenth century the heavy helmet was to a great extent discarded by the Western knights for the lighter basciner; but it continued to be used in tournaments until the eighteenth century. As the employment of firearms became more general, helmets naturally lost their utility, especially as regards the face. Those still remaining are, in the equipment of troops, limited for the most part to heavy cavalry, afford no protection to the face, and must be considered as rather for ornament than use. Firemen wear a heavy headpiece of leather and brass to protect them as far as possible from falling brands and cinders at conflagrations. In India and other hot climates, helmets of white felt, with the additional screen of rolls of linen, are worn by the military as well as by members of the civil service to protect them from the hot rays of the sun.

In heraldry, the helmet, from the early simple form known as the Norman, came at a later period to vary in shape according to the degree of the person who bore it, and helmets were set over coats of arms to bear the crest and to indicate by their form the rank of the bearer. The following forms of helmet are in use in English heraldry: (1) The helmet assigned to the King and to the princes of the blood royal; it is full-faced, composed of gold, and has the visor divided by six projecting bars. (2) The helmet of a duke or marquis is of steel, with five bars of gold. (3) The helmet of earls, viscounts, and barons is of silver, adorned with gold, has five bars, and is set in profile. (4) The helmet of knights and baronets is of steel, full-faced, with the visor thrown back and without bars. (5) The helmet of esquires is always presented in profile, and is of steel with the visor closed. These distinctions are of comparatively recent date. A much greater variety of helmets is in use in Continental heraldry. A helmet is never placed over the arms of any woman except the sovereign. See HERALDRY.

HELMET-BIRD. One of the names given to the turacos (q.v.), on account of their high, brilliantly colored crests. An Australian cockatoo, the ganga (q.v.), is called 'helmet-cockatoo,' and a genus of African shrikes (Prionops) are called 'helmet-shrikes' for a similar reason.

HELMET-CRAB. See KING-CRAB.

HELMET-CREST. A South-American humming-bird of the genus Oxypogon (in which there are three species) which has a tall, pointed, erectile crest suggesting a helmet-plume, and also chin-feathers resembling a long beard. See Plate of HUMMING-BIRDS.

HELMET-HORNBILL. See HORNBILL.

HELMET-QUAIL. A California crested quail (q.v.).

HELMET-SHELL (so called from the resemblance of the shell to a helmet). One of a genus (Cassis) of large, active gastropods, allied to the strombs, and typical of the family Cassidæ. They have thick, heavy shells, boldly ridged, and often handsomely colored, and some species, as the black helmet-shell of the West Indies (erroneously named *Cassis Madagascarensis*) and *Cassis glauca* of the East Indies, are extensively used for making cameos (q.v.), because the shell is in layers of different colors. About fifty species are known, mostly Oriental; but some inhabit the Mediterranean and West Indian waters, and all are carnivorous, preying mostly on bivalve mollusks.

HELMHOLTZ, hĕlm'hôlts, HERMANN VON (1821-94). A German physicist, one of the most distinguished scientific men of the nineteenth century, and an authority in several departments of science. He was born at Potsdam, and studied medicine in Berlin, subsequently serving as a surgeon in the army (1843-47). He then became assistant in the Berlin Anatomical Museum, and a professor of physiology, occupying chairs at Königsberg (1849-58), at Bonn (1855-58), and at Heidelberg (1858-71). In 1871 he became professor of physics at the University of Berlin. For several years prior to his death Helmholtz was president of the Physikalisch Technische Reichsanstalt at Charlottenburg, and supervised the researches of this important institution. He was equally distinguished in physiology and in experimental and mathematical physics. He was selected as honorary president of the International Congress of Electricians held at Chicago in 1893, and it was said then of him that he might have been easily first in several other departments of human knowledge quite distinct and apart from that of electricity. His physiological works are principally connected with the eye and the nervous system. As a physicist Helmholtz first attracted attention from the scientific world by a paper which he presented to the Physical Society of Berlin in 1847 on the "Conservation of Force." This paper, regarded by many as a fantastic speculation, provoked considerable discussion and established Helmholtz's reputation. His invention of the ophthalmoscope (q.v.), an instrument which enables an observer to examine the interior of the eye, gave to the oculist a most useful device now in universal use. His wonderful monograph on *Sensations of Tone* was first published in 1863, and is the most important work on acoustics of the nineteenth century. To Helmholtz is due the generally accepted theory of color, which is that of Young (q.v.) in a modified form, wherein the perception of color depends upon the three fundamental sensations of red, green, and violet or blue. He also developed the electro-magnetic theory of light in a manner which indicated its general possibilities. Another important research was on the theory of vortex motion, and not only did he discover the fundamental properties of such motion, but he so stated his conclusions that they have been used to explain various physical phenomena and in hypotheses concerning the constitution of matter and the luminiferous ether. He was the inventor of many ingenious methods in practical physics, as well as new apparatus. In 1883 the German Emperor conferred upon him a title of nobility. He visited the United States in 1893, and died in Berlin, September 8, 1894. The first edition of *Die Lehre von den Tonempfindungen, als physiologische Grundlage*

für die Theorie der Musik, appeared in 1863, and several other editions and translations have since been published. The *Handbuch der physiologischen Optik* was published in 1867, and Helmholtz's *Gesammelte wissenschaftliche Abhandlungen* in 1882-83. Helmholtz was a contributor to the leading scientific journals of the world, and was the recipient of many honors. An interesting biographical sketch, by Prof. A. W. Rücker, F.R.S., was published in the *Fortnightly Review* for November, 1894, and reprinted in the *Smithsonian Report* of the same year.

HELMOLD, hĕl′môlt. A twelfth-century German historian of the Slavs. He was born in Holstein, and was a priest at Bosau. He was intimate with Gerold, the Bishop of Lübeck, who had done missionary work among the Slavs, and who urged him to write a history of the wars with them and the missions among them. This history, *Chronica Slavorum*, covered the period from Charlemagne to Helmold's own time and the days of Henry the Lion (1172), and was continued to 1209 by Arnold von Lübeck (q.v.). It is best edited by Lappenberg (1868), separately, and in vol. xxi. of *Monumenta Germaniæ*.

HELMOLT, hĕl′môlt, Hans F. (1865—). A German editor and historian, born at Dresden. He obtained a university education, and was appointed to an editorial post in the Bibliographic Institute at Leipzig. His publications include historical studies, such as *König Ruprechts Zug nach Italien* (1892), and *Fabricius und Siber* (1895), and the compendious *Weltgeschichte* (1899-1901), a work based on an ethnographic method, in the preparation of which he was assisted by German and other specialists.

HELMOND, hĕl′mônt, *Fr. pron.* ĕl′môn′. A town in the Province of North Brabant, Holland, situated on the Zuid Willems Canal, 23 miles by rail northwest of Venlo (Map: Netherlands, D 3). There are a number of extensive textile mills, dyeing establishments, cigar-factories, and various other manufacturing establishments. Population, in 1890, 9029; in 1900, 11,436.

HELMONT, hĕl′mônt, Jan Baptista van (1577-1644). A Belgian physician and chemist, born at Brussels. He studied at Louvain, and on the completion of his education accepted the chair of surgery in that university, the duties of which he discharged for two years. The study of the work of Paracelsus seems to have turned his attention to chemistry and natural philosophy, and in the pursuit of these sciences he spent several years in different universities of Italy and France; after which he returned home, married Margaret van Ranst, a noble lady of Brabant, and settled down at his estate near Vilvorde, where he spent the remainder of his life in investigations of various kinds. Writers of the history of chemistry regarded him as one of the greatest chemists who preceded Lavoisier. He paid much attention to the study of gases, and is supposed to have been the first to use the word *gas* as a generic name for all elastic aëriform fluids. Of these gases he distinguished several kinds. He was also the first to take the melting-point of ice and the boiling-point of water as standards of the measurement of temperature. In his works the term 'saturation' was first employed to signify the combination of an acid with a base, and he was an early investigator of the chemistry of the fluids of the human body. Along with other physiologists of his day, he speculated much on the seat of the soul, which he placed in the stomach. His reasons are chiefly these two: (1) It cannot exist in the brain, because, as he thought, that organ contains no blood; (2) it does exist in the stomach, because, when we hear bad news, we lose our appetite.

The most important of his works is his *Ortus Medicinæ*, which was published by his son, four years after his death; it passed through a very large number of editions, and was translated into Dutch, French, German, and English. A curious volume, containing translations of some of his works, was also published by W. Charlton, in 1650, under the title of *The Ternary of Paradoxes; the Magnetic Cure of Wounds; the Nativity of Tartar in Wine; and the Image of God in Man.*

HELMSTEDT, hĕlm′stĕt. A town in the Duchy of Brunswick, Germany, situated 25 miles by rail from the city of Brunswick (Map: Germany, D 2). It was formerly famous for its university, founded here in 1575, and suppressed in 1809. The university buildings now contain the remnants of the university library. Helmstedt manufactures agricultural machinery, pottery, woolens, soap, etc. About two miles from the town are the Helmstedt springs, whose waters, containing iron salts, are much used. Population, in 1890, 10,955; in 1900, 14,259.

HEL′MUND, or **HIL′MEND.** The largest river of Afghanistan. It rises in the Koh-i-Baba chain, and flows southwest, receiving numerous tributaries by which it drains the southern part of the country (Map: Asia, Central, J 5). It discharges into the lake, or rather swamp, of Savaran, near the Persian frontier. Its total length is estimated at over 600 miles. The channel of its lower course is very wide and deep, but is filled only during the summer. The region traversed by the lower course of the Helmund is well populated, and the water-power of the river is used by numerous mills.

HEL′MUTH, William Tod (1833-1902). An American homeopathic physician. He was born in Philadelphia, and studied medicine there and in San Francisco. In 1888 he received the degree of LL.D. from Yale. He was dean and professor of surgery in the New York Homeopathic Medical College, had several hospital positions, and published numerous essays, both literary and medical, such as: *Scratches of a Surgeon* (1879); *A Steamer Book* (1880); *Diphtheria; Medical Pomposity; System of Surgery; Suprapubic Lithotomy;* and some verses, *With the Pousse-Café.*

HE′LODER′MA (Neo Lat., from Gk. ἧλος, *hēlos*, nail, wart + δέρμα, *derma*, skin). A genus of North American lizards, with two species, of which one is the poisonous Gila monster. It represents, according to Cope, a family (Helodermatidæ) and superfamily (Helodermatoidea), characterized prominently by the fact that the eight to ten acrodont teeth in each jaw are anchylosed by oblique bases, and each is fang-like and grooved both before and behind, as if designed for conducting fluid poison. For full structural details, consult Cope, *Crocodilians, Lizards, and Snakes* (Smithsonian Institution, Washington,

D. C., 1900); for external appearance and habits, see GILA MONSTER.

HELOÏSE, ȧ'lō'ēz'. See ABÉLARD.

HĒ'LOS (Lat., from Gk. Ἕλος, from ἕλος, *helos*, marsh). A town of Laconia, near the coast and a short distance east of the mouth of the Eurotas, said to have been founded by Helenus, son of Perseus. When the Dorians invaded the Peloponnesus, Helos defended itself with great stubbornness; it was finally taken and the inhabitants were made slaves. In Strabo's time it had become a village, and when Pausanias visited it it was already in ruins. The Helots were supposed to have received their name from this town; but the most probable view is that the ethnic term is related to the root ἑλ-, *take*. The plain of the lower Eurotas is still called *Helos*. There were several other towns of this name in ancient Greece—one mentioned in the *Iliad*, and one situated in Argolis.

HEL'OTISM (from Lat. *Helota*, Gk. Εἱλώτης, *Heilōtēs*, or Εἵλως, *Heilōs*, Helot). A symbiotic relation in which one subject (see SYMBIOSIS) is regarded (perhaps somewhat fancifully) as enslaved by another. This relation differs from parasitism in that the enslaved form is not necessarily harmed; it may even be benefited. Lichens (q.v.) have been given as the type of helotism, the alga being regarded as enslaved by the fungus.

HELOTS, hē'lots *or* hēl'ots (Lat. *Helotæ*, from Gk. Εἵλωτες, *Heilōtes*, or Εἱλῶται, *Heilōtai*; probably connected with ἑλεῖν, *helein*, to seize, less plausibly with Ἕλος, *Helos*, a town of Laconia, whence the first Helots were said to have been enslaved). The lowest of the three classes into which the population of ancient Laconia was divided. The Helots were serfs of the soil, the property of the State, by whom alone they could be freed, but assigned to individual Spartans for the cultivation of their allotments of land. If the Helots were originally the descendants of the pre-Dorian population, the distinction of dialect and descent was early lost, for there is no indication of any social or linguistic difference between them and the ruling Spartans. The Helots paid the Spartan proprietors a fixed amount of produce, but could keep the remainder, and were thus enabled to acquire property. In fact, in general appearance and intelligence they seem to have been much like the free village population in other parts of Greece. In war they served as light-armed troops or on shipboard, and after the Peloponnesian War were sometimes employed in the heavy infantry, especially in Asia Minor. They were subject to harsh treatment, and were in the absolute power of the Ephors, though many of the ancient stories are scarcely trustworthy. Their great superiority in numbers and their known discontent rendered them objects of suspicion; and during the Peloponnesian War 2000 of them, who claimed to have rendered distinguished services, were freed and then secretly murdered (see Thucyd. iv. 20). The Spartan secret service (κρυπτεία), in which the young men were sent singly through the land to endure hardships and watch symptoms of discontent, kept the Helots under close observation, and any who showed special strength or intelligence are said to have been secretly assassinated. The statement that the Ephors annually declared formal war upon the Helots is doubtless an error.

HELP. The character in Bunyan's *Pilgrim's Progress* by whom Christian is rescued from the Slough of Despond.

HELP'ER, HINTON ROWAN (1829—). An American author and railway projector. He was born near Mocksville, N. C.; graduated at Mocksville Academy in 1848, and from 1851 to 1854 lived in California. In 1857 he published a book entitled *The Impending Crisis in the South, and How to Meet It*, which perhaps did more to arouse a widespread opposition in the North to the institution of slavery than any other book except *Uncle Tom's Cabin*. This book was dedicated to the 'non-slaveholding whites' of the South, and was written to prove that, wholly aside from its immorality, slavery was an economic curse. Between 1857 and 1861 nearly 150,000 copies of the book were circulated, and in 1860 the Republican Party distributed it as a campaign document. From 1861 to 1866 Helper was United States Consul at Buenos Ayres, Argentine Republic, and afterwards devoted his attention chiefly to the promotion of his projected intercontinental railway, or 'Three Americas Railway,' to extend eventually from Bering Sea to the Strait of Magellan. In addition to *The Impending Crisis*, his publications include: *The Land of Gold* (1865); *Nojoque: A Question of a Continent* (1867); *The Negroes in Negroland, the Negroes in America, and the Negroes Generally* (1868); *Oddments of Andean Diplomacy* (1879); and *The Three Americas Railway* (1881).

HELPS, Sir ARTHUR (1813-75). An English essayist, born at Streatham, Surrey. He was educated at Eton, and at Trinity College, Cambridge, where he graduated B.A. in 1835 and M.A. in 1839. He obtained a post in the civil service, but resigned in 1841 and retired to the country, where he cultivated his taste for literature. In 1860 he was appointed clerk of the Privy Council, a post which he held until his death. For Queen Victoria he edited the speeches of the Prince Consort (1862), and prepared for the press her own Highland journals (1868-69). After beginning his literary career in 1835 with a series of aphorisms entitled *Thoughts in the Cloister and the Crowd*, Helps attempted the essay, the novel, the drama, and history. With the drama and the novel he failed utterly; with history he succeeded moderately. In this field his best work is represented by *Las Casas* (1868), *Columbus* (1869), *Pizarro* (1869), and *Cortez* (1871)—biographies which grew out of his *Conquerors of the New World and Their Bondsmen* (1848-52), and *The Spanish Conquest in America* (4 vols., 1855-61). By his essays he won his contemporary fame, especially by *Friends in Council* (1st series 1847; 2d series 1859). It consists of conversations on social and intellectual questions. Helps exhibits throughout these dialogues acuteness, humor, a satire which gives no pain, and a quiet depth of moral feeling and sense of man's social responsibilities.

HELSINGBORG, hēl'sīng-bôr-y'. A fortified seaport of Sweden, situated at the narrowest point of the sound, opposite the Danish town of Elsinore, with which it is connected by ferry (Map: Sweden, E 8). Several railroad lines run into the town, and it carries on a flourishing trade with Denmark. It exports iron ore, bricks, earthenware, grain, and fish; imports coal, min-

erals, gun-metal, and fertilizers. It has considerable manufactures of sugar, chemicals, and machinery, and has a slaughter-house and shipbuilding yards. Population, in 1901, 24,670. Helsingborg has played a prominent part in the Scandinavian wars. It was almost destroyed in the war between Sweden and Denmark during the reign of Charles XI., and was the scene of a Danish defeat at the hands of Swedish peasants in 1710.

HELSINGFORS, hĕl'sĭng-fôrs. The capital of the Grand Duchy of Finland, as well as of the Government of Nyland (Map: Russia, B 2). It is beautifully situated on a peninsula on the Gulf of Finland, 191 miles west of Saint Petersburg by sea. The entrance to the harbor is protected by a series of formidable batteries, called the fortifications of Sveaborg, and consisting of seven strongly fortified islands and numerous islets, while the harbor itself is further defended by two forts. Helsingfors is next in importance to Cronstadt as a naval station on the Baltic, and the largest and handsomest town of Finland. Its streets are broad and regular, and there are a number of handsome squares. Of the public buildings, the most prominent are the residence of the Governor, the Senate House, the university buildings, the Lutheran Church of Saint Nicholas, the Russian Church (completed in 1868), the Athenæum (built in 1887), with a picture gallery, and the new theatre. The university, originally founded at Åbo in 1640, and removed to Helsingfors in 1829, comprises four faculties, with over 2500 students, a library of 190,000 volumes, a hospital, a zoölogical and botanical museum, a botanic garden, and a valuable observatory. Another prominent educational institution is the Polytechnical Institute. Helsingfors is the seat of many learned societies. Since 1840 Helsingfors has been a favorite bathing-place, and attracts many visitors from Saint Petersburg during summer. The town carries on a considerable trade in agricultural and dairy products with Saint Petersburg, England, and Swedish and German ports. It has manufactures of beer, sugar, tobacco, liquors, carpets, linen, etc. Helsingfors is the seat of the Governor-General of Finland, the Finnish Diet, and numerous consular representatives, including one from the United States. Population, in 1900, 93,217, of whom over 50 per cent. are Swedes, nearly 43 per cent. Finns, and the rest Russians and Germans.

Helsingfors was founded by Gustavus I. of Sweden in the middle of the sixteenth century, a short distance inland; it was removed to its present site in 1642. It was fortified in 1729, and came into the possession of Russia in 1809. In 1812 it became the capital of Finland. During the Crimean War it was bombarded for two days and nights by the allied fleet without any appreciable injury to its fortifications.

HELSINGÖR, hĕl'sĭng-ĕr. A seaport of Zealand, Denmark. See ELSINORE.

HELST, hĕlst, BARTHOLOMEUS van der (c.1611-70). A Dutch portrait painter. His birthplace is uncertain, being assigned to Haarlem and to Dordrecht, and the year of his birth falls between 1611 and 1614. He is reputed to have been a pupil of Frans Hals (q.v.) at Haarlem, and a few of his works, indeed, show this influence. But his art on the whole was directly the opposite of Hals's, and he was more influenced by his other master, Nicolaes Elias of Amsterdam. The researches of Scheltema show that he was living in Amsterdam in 1636, and probably much earlier. There he married the attractive Constantia Reinst, and in 1654, in conjunction with Nicolaes de Helt Stokade, he founded the Painters' Guild of Saint Luke. He died at Amsterdam, December 16, 1670.

His best-known work is the "Banquet of the Civic Guard," now in the Museum of Amsterdam, which was painted to represent the celebration of the Peace of Westphalia in 1648. It contains twenty-four full-length portraits, characteristic, well modeled, and rich in color. In the same museum are the "Syndics of the Brotherhood of Saint Sebastian" (1663), of which there is a replica in the Louvre; the four "Syndics of the Marksmen;" the "Company of Captain Rogloff Bicker" (1639), thirty-two figures in all; the portraits of the Princess Maria Henrietta Stuart, Burgomaster Andries Bicker, Admirals Kortenaar, Van Ness, and others. Among his other portraits are those of a "Protestant Dame" (1638), and of Paul Potter, at The Hague; a "Lady in Blue," in the National Gallery of London; Admiral Van Tromp, at Munich; and the portrait of the artist in the Uffizi, Florence. In America there are portraits of an "Unknown Lady," in the New York Historical Society, and of a "Dutch Burgomaster," in the Metropolitan Museum, New York. The heads of Helst's portraits are well characterized, and all the details, especially the hands, are carefully carried out, though without sacrifice of breadth. His color is clear and powerful.

HEL'STON, DOCTOR MATTHEWSON. The rector of Briarfield, in Charlotte Brontë's novel *Shirley*, the uncle of Caroline, and a man of imperious temper though upright principles. The character was suggested in part by Patrick Brontë, the author's father, and in part by a friend of his, Mr. Roberson, Vicar of Heckmondwike.

HELVE'DIUS. The nom-de-plume signed by James Madison to his five essays, published in various public journals (1793-96), criticising the foreign policy of the Administration, and replying to the letters of Hamilton, signed 'Pacificus.'

HELVELLYN, hĕl-vĕl'ĭn. One of the highest mountains in England, 3118 feet high, in the Lake District, Cumberland, between Keswick and Ambleside (Map: England, C 2).

HELVET'IC CONFESSIONS. See CREEDS AND CONFESSIONS.

HELVETIC REPUBLIC. See SWITZERLAND.

HELVE'TII (Celtic, possibly connected with Welsh *elw*, gain). A Celtic people inhabiting, according to Cæsar, the region between the Jura Mountains on the west, the Rhône on the south, and the Rhine on the east and north, the region corresponding closely with the western part of modern Switzerland. They are first mentioned as defeating a Roman army in B.C. 107, and in 101 they accompanied the Cimbri on their invasion of North Italy. The great event in their history is their attempted irruption into Gaul, in which they were repulsed by Cæsar. They collected three months' provisions, burned 12 cities, 400 villages, and all isolated dwellings, and made a general rendezvous by Lake Leman,

in the spring of B.C. 58. Cæsar hastened to Geneva, destroyed the bridge there, raised two legions in Cisalpine Gaul, and when the Helvetians sent delegates to demand a passage delayed them until he had built a wall along the Rhône 19 Roman miles in length, flanked with redoubts. Having vainly attempted to pass this barrier, the Helvetii took another route, but were followed and defeated with a terrible slaughter at Bibracte (modern Mont-Beuvray, in Burgundy), and the remnant were obliged to return to their own country, where they became subject to the Romans. Of 368,000 who left their homes, according to Cæsar, including 92,000 fighting men, only 110,000 returned. In the commotions which followed the death of Nero, the Helvetians met with another catastrophe. Remaining faithful to Galba, they were attacked by Cæcina, a general of Vitellius, who gave them over to the rapacity of his legions. From this time they scarcely appear as a distinct people.

HELVÉTIUS, hĕl-vē′shĭ-ŭs, *Fr. pron.* ĕl′vȧ′-sē′ụs′, CLAUDE ADRIEN (1715-71). A noted French encyclopædist. He was born in Paris in 1715, educated at the Collège Louis-le-Grand, and after some practical training at Caen appointed at the age of twenty-three to the lucrative office of farmer-general; but as he was of a very humane and gentle disposition, the cruel and odious duties connected with the post decided him to resign it subsequently for the situation of chamberlain to the Queen's household. He wearied of the idle and dissipated life of the Court, and marrying in 1751 the daughter of the Comte de Ligneville, he withdrew to a small estate at Voré, where he spent the most of his life in the education of his family, the improvement of his peasantry, and literary labors. In 1758 appeared his celebrated work, *De l'esprit*, in which he endeavored to prove that sensation (*sensibilité*) is the source of all intellectual activity, and that the grand lever of all human conduct is self-satisfaction. But he admits, at the same time, that self-satisfaction assumes different forms; e.g. the self-satisfaction of a good man consists in the subordination of private to more general interests—first to the circle among which he lives, then to the community, and finally to the world at large. The book was denounced by the doctors of the Sorbonne, and condemned by the Parliament of Paris to be publicly burned. He then went to England and to Germany, where Frederick II. received him with distinction. He died in Paris, December 26, 1771, leaving behind him, besides some other writings, a work called *De l'homme, de ses facultés intellectuelles, et de son éducation* (published 1772). His collected works were published in Paris in 1791, in 14 volumes. Consult: Morley, *Diderot and the Encyclopædists* (London, 1878); Avezac-Lavigne, *Diderot et la société du Baron d'Holbach* (Paris, 1875).

HELVIG, hĕl′vĭk, AMALIE VON (1776-1831). A German poet, born Amalie von Imhoff, at Weimar. She received a careful education, and traveled much. In 1803 she married a Swedish officer, Karl Gottfried von Helvig, who entered the Prussian service in 1815. Several of her poems were first published by Schiller in the *Musenalmanach*, and her "Abdallah und Balsora" appeared in the *Horen*. She read Greek, and Goethe taught her to use the hexameter, in which she composed the epic *Die Schwestern von Lesbos* (1800). Her other works include a translation of the *Fridthjof's Saga* (last ed. 1879); the collection *Taschenbuch der Sagen und Legenden* (1812-13); and the poems *Die Schwestern auf Corcyra* (1812), *Die Tageszeiten* (1812), *Die Sage vom Wolfsbrunnen* (1821), and *Helene von Tournon*. For her biography consult Bissing (Berlin, 1889).

HEL′VIUS CIN′NA, GAIUS. An eminent Roman poet, who lived about B.C. 50. He was a friend of Catullus, and was considered by Vergil a poet superior to himself. On the day of the funeral of Julius Cæsar, he was killed by the infuriated rabble, which, defeated in its attempt to fire the houses of Brutus and Cassius, encountered him, and mistook his name for that of Cornelius Cinna, the prætor of the year, and one of the conspirators against Cæsar. By the ancient historians who narrate this, he is called a tribune of the plebeians. The story of his dream as given by Plutarch (*Cæs.* 68) has been introduced by Shakespeare into the drama of *Julius Cæsar* (act iii., scene 3). His most highly esteemed work was the *Smyrna*, whose subject is unknown, but whose style is shown by two extant fragments to have been epic. He wrote also a poem entitled "Propempticon Pollionis," in respect to which the few lines preserved afford no information. Prior to the publication of the *Æneid*, the *Smyrna* was regarded as the most complete thesaurus of Roman mythology. Consult: Weichert, *Commentationes II. de Caio Helvio Cinna, Poeta* (1822-23); and Kiessling, "De C. Helvetio Cinna Poetica," in *Commentationes Mommsenianæ* (Berlin, 1877).

HE′LY-HUTCH′INSON, JOHN, Baron HUTCHINSON (1757-1832). An English general, son of John Hely-Hutchinson (1724-94). He was educated at Eton and at Trinity College, Dublin, and in 1798 was in command at Castlebar when the French landed in Killalla Bay, but General Lake succeeded him previous to the flight of the raw Irish troops. Two years after he was appointed a chief of division in Abercromby's army in Egypt, and assumed command in the battle of Alexandria when that general was mortally wounded. He succeeded, in spite of disaffection among his officers, in separating the two superior French forces; then forced the surrender of Cairo (June, 1801), and two months later of Alexandria.

HELY-HUTCHINSON, Sir WALTER FRANCIS (1849—). An English colonial administrator, born in Dublin, and educated at Harrow and at Trinity College, Cambridge. He was attaché to Sir Hercules Robinson in Fiji (1874), and, after serving as private secretary for Fiji Affairs and for New South Wales Affairs, became Colonial Secretary of the Barbadoes (1877), and chief secretary to the Governor of Malta (1883), where he was Lieutenant-Governor for five years (1884-89). He was then appointed Governor of the Windward Islands (1889), and four years later of Natal, where he introduced 'responsible government,' and of Zululand, to which he annexed the territories across the Pongola (1895). In 1895 he was made Special Commissioner for Tongaland, and in 1901 was transferred to the Cape of Good Hope as Governor of the Colony.

HÉLYOT, ȧ′lyō′, PIERRE (1660-1716). A French Franciscan scholar. He was born and died

in Paris; entered the Franciscan convent of the strict observance, 1683; devoted himself to the exhaustive study of the monastic Orders and congregations, and produced the masterpiece, which has been the source whence innumerable writers have drawn, *Histoire des ordres monastiques religieux et militaires et des congrégations séculières de l'un et l'autre sexe, qui ont été établies jusqu'à présent* (8 vols., 1714-19); an enlarged edition in four volumes by Migne, *Encyclopédie théologique*, appeared in Paris, 1858-59.

HEM'ANS, FELICIA DOROTHEA (BROWNE) (1793-1835). An English poet, born in Liverpool. Her early taste for poetry was so far encouraged that she was permitted to publish a volume of juvenile verse in 1808. This was followed with another volume in 1812, in which year she married Captain Hemans, an Irish gentleman, who had served in Spain. In 1818, after the birth of five sons, she separated from him. She spent the rest of her life in North Wales, in Lancashire, and in Dublin, where she died. Among her works are: *The Forest Sanctuary* (1825), in the second edition of which, published in 1829, first appeared "Casabianca;" *Records of Women* (1828); *Songs of the Affections* (1830); *Hymns for Childhood; National Lyrics and Songs for Music;* and *Scenes and Hymns of Life* (1834). She also wrote three dull plays, and contributed to the magazines. A volume of *Poetical Remains* appeared after her death, and a complete edition of her works, with a memoir by her sister, in seven volumes, in 1839. Mrs. Hemans, without great daring or force, is sweet, natural, and pleasing; but too fluent, she wrote too much and too hastily. Her lyrics are her best productions, her more ambitious poems being very insipid. Still, she was a woman of talent, and some of her little pieces, such as "The Graves of a Household," "The Treasures of the Deep," and "The Homes of England," are admirable in pathos and sentiment. Consult: Chorley, *Memorials of Felicia D. Hemans* (London, 1836); *Poetical Works*, with memoir, ed. by W. M. Rossetti (ib., 1873); and Espinasse, *Lancashire Worthies* (ib., 1874).

HEM'ATITE (Lat. *hæmatites*, from Gk. αἱματίτης, *haimatitēs*, blood-like, from αἷμα, *haima*, blood), or SPECULAR IRON. An iron sesquioxide that crystallizes in the hexagonal system. The spectacular varieties are crystallized and have a metallic lustre, whence their name. Hematite also occurs in fibrous varieties, which have a sub-metallic or metallic lustre, and are brownish-red to black in color; while the earthy varieties, known as *red ochre* and *argillaceous hematite*, are red to brownish-black in color. It is a valuable ore of iron, containing when pure 70 per cent. of that metal, and is widely distributed throughout the world. In North America, deposits of great thickness are found in the Lake Superior region, which includes the famous deposits of the Gogebic, Marquette, Menominee, Mesabi, and Vermilion ranges, where the output in 1899 reached a total of 17,802,955 long tons. Deposits at Pilot Knob and Iron Mountain in Missouri were formerly famous, but have not been extensively worked in recent years. See IRON.

HEM'EL HEMP'STEAD. A market-town and municipal borough in Hertfordshire, England, 23 miles northwest of London (Map: England, F 5). Its industries comprise boat-making, paper-making, straw-plaiting, iron-foundries, tanneries, and breweries. Its incorporation dates from 1898, and much activity is being shown in public works and improvements. The town owns fine town hall buildings and a corn exchange and markets. Population, in 1891, 9700; in 1901, 11,300.

HEM'ERALO'PIA. A disorder of vision in consequence of which objects cannot be seen well in ordinary daylight. Distant vision is only possible by strong artificial light or in twilight. See SIGHT, DEFECTS OF.

HEM'EROBAP'TISTS (from Gk. ἡμεροβαπτιστής, *hēmerobaptistēs*, from ἡμέρα, *hēmera*, day + βαπτιστής, *baptistēs*, baptist, from βαπτίζειν, *baptizein*, to baptize). A sect of Jews mentioned by Eusebius (*Hist. Eccl.* iv. 22) on the authority of Hegesippus, by Epiphanius (*Hær.* 17), and Justin Martyr in the *Dialogue with Tryphon.* Their distinguishing feature seems to have been the daily ablution. Nothing further is known of them except that the Clementine Homilies speak of John the Baptist as a member of the sect. Some have thought that the term was not properly the name of a sect, but a derisive epithet applied to certain of the Pharisees and others who were particularly scrupulous about the ritual washings. The name is also applied to the Mandæans or Christians of Saint John. See MANDÆANS.

HEM'EROCAL'LIS. See DAY-LILY.

HEM'ESSEN, HEMISHEM, or **HEM'SEN,** JAN VAN (c.1500-1566). A Dutch painter, born at Hemixhem, near Antwerp. His real name was Jan Sanders. He was a pupil of Hendrik van Cleve, became dean of the Antwerp Guild (1548), and in 1551 went to Haarlem, where probably he lived for the remainder of his life. He was an imitator of Quentin Massys, and is noticeable for having remained steadfast to the Dutch traditions when the influence of Italian art was dominant. His works include some portraits. His daughter, CATHARINA, married a Dutch musician, and entered the service of the Queen of Hungary, with whom she went to Spain. There is a picture by her, dated 1552, in the National Gallery, London.

HEM'IANOP'SIA. See HEMIOPIA.

HEMICHORDA, hĕm'ĭ-kôr'dȧ. Same as Adelochorda (q.v.). See BALANOGLOSSUS.

HEM'ICRA'NIA (Lat., from Gk. ἡμικρανία, *hēmikrania*, pain on one side of the head, from ἡμι-, *hēmi-*, half + κρανίον, *kranion*, skull). A headache affecting one side of the head. See HEADACHE; MIGRAINE.

HEM'ICYCLE, THE. A painting by Paul Delaroche (1835) on the wall of the amphitheatre at the Ecole des Beaux-Arts, Paris. Seventy-five figures, 23 feet in height, represent the artists, and symbolize the art of all periods. Phidias, Ictinus, and Apelles are in the centre of the group.

HEMIGALE, hê-mīg'a-lê (Neo-Lat., from Gk. ἡμι-, *hēmi-*, half + γαλῆ, *galē*, weasel). An East Indian weasel-like civet (*Hemigalea Hardwickii*), about the size of an ichneumon, and grayish-brown, with six or seven dark wide stripes across the back. It feeds on eggs and small animals.

HEM'IMET'ABOL'IC INSECTS (from Gk. ἡμι, *hēmi-*, half + μεταβολή, *metabolē*, transformation, from μεταβάλλειν, *metaballein*, to transform, from μετά, *meta*, after + βάλλειν, *ballein*, to throw). Insects that have a partial or incomplete metamorphosis. There are often very great differences between the habits and the structure of the young and the adults. For example, in the case of the cicadas, the larvæ live in the ground and have fore legs fitted for burrowing, while the adults, which appear only after a period of pupation, fly about and rest in herbage. In other forms, such as dragon-flies, the larvæ are aquatic and have tracheal gills, while the adults are winged and have open trachea. The orders of the hemimetabolic insects are Plecoptera, or stone-flies; Isoptera, white ants or termites; Corrodentia, psocids and book-lice; Mallophaga, bird-lice; Euplexoptera, ear-wigs; Hemiptera, cicadas, chinch-bugs, squash-bugs, bedbugs, plant-lice, etc.; and Orthoptera, grasshoppers, crickets, and walking-sticks. Fossil insects belonging to this group have been found in the coal basins of Illinois, Pennsylvania, and Colorado. See METAMORPHOSIS.

HEMI'NA, LUCIUS CASSIUS. A Roman annalist who lived about 145 B.C., and wrote a history of Rome from the founding of the city to the end of the Third Punic War (Pliny xiii. 84; xxix. 6). Though the work is frequently cited by Pliny, Nonius, and Aulus Gellius, only a few fragments are preserved. These are given in Peters, *Fragmenta Historicorum Romanorum* (Leipzig, 1883).

HEM'ING, JOHN. Coeditor with Condell of the first folio of Shakespeare. See CONDELL, HENRY.

HEM'IO'PIA, HEM'IANO'PIA, or **HEM'IANOP'SIA** (Neo-Lat., from Gk. ἡμι-, *hēmi-*, half + ὄψ, *ōps*, eye). A disorder of sight, consisting in loss of vision for corresponding halves or sections of the visual field. It depends upon the arrangement of the nerve-fibres running from the brain through the optic nerves to the eyes. The fibres coming from each half of the brain, through the optic tracts, meet at a point called the optic chiasm, where some fibres cross over to the optic nerve of the opposite side and some go to the eye of the same side. From the way in which this crossing and subsequent arrangement of the fibres takes place, the right halves of both retinæ, and so the left halves of both visual fields, are supplied from the right half of the brain through the right optic tract. An affection of one optic tract will, therefore, cause loss of vision in the corresponding half of each retina, and so loss of the field of vision of the opposite side. This is homonymous or lateral hemiopia. A lesion in the chiasm destroying all the crossing fibres causes loss of vision in the outer half of the field of both eyes, bitemporal hemiopia, known, together with a possible loss of the inner field of both eyes, as crossed hemiopia.

HEM'IPLE'GIA (Neo-Lat., from Gk. ἡμιπλής, *hēmiplēx*, smitten on one side, from ἡμι-, *hēmi-*, half + πλήσσειν, *plēssein*, to strike). Paralysis (q.v.) limited to one side of the body. In some cases part of the face is also involved, if the cause of the paralysis affects the origin or the course of the facial nerve. The cause is usually a hemorrhage within the brain-cavity, that is, apoplexy (q.v.); or a collection of fluid; or a tumor. Because of the fact that about 90 per cent. of the fibres in the pyramids of the brain pass to the opposite side of the body (see NERVOUS SYSTEM), the paralysis occurs on the opposite side of the body from the site of the lesion in the brain, unless the lesion is situated below the decussation of the fibres. While the motor nerves are principally affected, the nerves of sensation are also more or less involved. Besides the causes named, epilepsy, hysteria, and chorea may also operate to cause hemiplegia, which in these cases is temporary. The treatment varies with the cause, and must always be under a physician's direction. Stimulants should never be administered to a paralyzed patient unless ordered by a physician. The prognosis varies according to the cause. If hemiplegia is due, as it very frequently is, to apoplexy, the first attack may terminate in more or less complete recovery; but even then subsequent attacks are likely to occur.

HEM'IPODE (Gk. ἡμίπους, *hēmipous*, half-footed, from ἡμι-, *hēmi-*, half + πούς, *pous*, foot). A book name for certain gallinaceous birds, usually regarded as a family (Turnicidæ), distinguished by a slender beak, and by the want of a hind toe. They are especially notable because all of the vertebræ remain distinct instead of being extensively anchylosed, as is usual in birds. The palate is like that of the Passeres, and Huxley and some other systematists have placed them in a separate order, the Hemipodii or Turnicomorphæ. They are the smallest of gallinaceous birds, and inhabit cultivated grounds and sterile sandy plains in warm countries. There are rather more than twenty species, in three genera. See BUTTON-QUAIL; ORTYGAN.

HEMIP'TERA (Neo-Lat. nom. pl., from Gk. ἡμι-, *hēmi-*, half + πτερόν, *pteron*, wing). An order of insects commonly known as bugs, and divided into the suborders Homoptera and Heteroptera. The name 'Hemiptera' was suggested by the appearance of the first pair of wings, the proximal half of which in many of the species (suborder Heteroptera) is thickened much like that of beetles. The wings of the suborder Homoptera, when present, are of equal thickness throughout. The mouth-parts of the Hemiptera are fitted for sucking, and the young undergo incomplete metamorphosis. The order is one of the most destructive to agriculture of all the insects. A few of the forms are useful in the economy of plants and man, for certain species prey upon injurious insects, while the species producing cochineal and wax furnish materials of commercial value. The injurious species include the loathsome lice and bedbugs, redbugs which do much damage to the cotton and orange crops, the vastly destructive chinch-bug, squash-bug, plant-lice, and scale-insects (qq.v.).

FOSSIL HEMIPTERA. The oldest known fossil insect, represented by a fragmentary wing of hemipteran relations, was found in the Upper Ordovician shales of Sweden. The earliest fossil bugs that have the mouth-parts preserved have been obtained from Carboniferous rocks and show these parts to have been, at that early period, of the highly specialized lancet form characteristic of the order, an indication of the very early evolution of the type. The scale-insects and mealy-bugs (Coccidæ), the harvest-flies (Cicadidæ), lantern-flies (Fulgoridæ), and tree-

HEMLOCK

1. TREE SHOWING FORM OF GROWTH

2. SPRAY SHOWING CONES

hoppers (Membracidæ) have their fossil ancestors in the Tertiary rocks. Some of the Heteroptera, such as the water-bugs, appear in the Jurassic. Chinch-bugs, squash-bugs, and bedbugs appear in the Liassic and Tertiary.

BIBLIOGRAPHY. Osborn, "Classification of Hemiptera," in *Entomologica Americana*, vol. i. (Brooklyn, 1885); Sharp, "Insects," in *Cambridge Natural History*, vols. v., vi. (London and New York, 1900); Comstock, *Manual for the Study of Insects* (Ithaca, 1895); Howard, *The Insect Book* (New York, 1901).

HEM'IRAMPH (from Gk. ἡμι-, *hēmi-*, half + ῥάμφος, *rhamphos*, snout). A fish of the family Hemiramphidæ. See HALFBEAK.

HEM'ISHEN. See HEMESSEN.

HEM'LING, HANS. A Flemish painter, more correctly MEMLING (q.v.).

HEMLOCK (AS. *hemlic, hymblicæ*, hemlock), *Conium*. A genus of plants of the natural order Umbelliferæ, the members of which have compound umbels of small white flowers, small involucres and involucels, the former consisting of several small leaflets, the latter of three leaflets all on one side; the limb of the calyx merely rudimentary, and a compressed ovate fruit with five prominent wavy ridges and no vittæ. The best known and only important species is the common or poison hemlock (*Conium maculatum*), which grows by waysides on heaps of rubbish, and in other similar situations throughout Europe, in some parts of Asia, and naturalized in North America and Chile. It has a root somewhat resembling a small parsnip; a round, branched, hollow, bright-green stem, two to seven feet high, generally spotted with dark purple; large tripinnate, dark shining green leaves with lanceolate pinnatifid leaflets. All parts of the plant are destitute of hairs. The whole plant has a nauseous smell, particularly if rubbed or bruised. The leaves and fruits are employed in medicine. The leaves should be gathered just before the time or at the commencement of flowering, and after the removal of the larger stalks they should be quickly dried by a heat not exceeding 120°. As, however, they sometimes yield little or none of the active principles in the plant, the fresh leaves are preferred. The whole plant contains the active principles, and many fatal cases of poisoning have been attributed to eating the roots under the mistaken idea that they were parsnips.

The uses of hemlock in medicine are few and unimportant and depend chiefly upon its action upon the motor nerves, beginning with their end-organs. Although large doses cause complete paralysis by their action upon the peripheral nerves, sensation and consciousness are not affected; death finally occurs by extension of the paralysis to the muscles of respiration. In large or poisonous doses it sometimes gives rise to coma, and sometimes to convulsions or violent delirium. Among the ancient Greeks poisoning by hemlock was a common mode of death for condemned criminals, but whether it was the juice of the common hemlock or the water-hemlock that was used is unknown. The strength of its preparations is very variable, as its active principles are volatile. Practically the only use of the drug is in tetanus, hydrophobia, strychnine poisoning, and other convulsive disorders. Even in these it is rarely used, and only to prevent exhaustion by lessening muscular contractions. Water-hemlock, or cowbane (*Cicuta virosa*), is also an umbelliferous plant, of a genus having vaulted umbels, a five-toothed calyx, and almost globose fruit, each carpel with five broad flattened ribs and evident single vittæ. Water-hemlock grows in ditches, the margins of ponds, and wet grounds in Europe and the north of Asia. It has a large fleshy white root, covered externally with fibres; an erect much-branched stem, two to five feet high; tripinnate leaves, with linear-lanceolate regularly and sharply serrated leaflets, one general involucre or only a single small leaflet, partial involucres of many short narrow leaflets, and white flowers. It is a virulent narcotic acrid poison. Another species, *Cicuta maculata*, is common in North America, growing in many places. It has a spotted stem, like that of true hemlock, the name of which it very generally receives in North America. The leaves are triternate, the leaflets ternate. It is a very poisonous plant, and is the cause of many deaths. Cicuta, in Latin, seems to have been the name of the same plant called *coneion* by the Greeks, but it is not known whether this or the previous plant was so denominated. See CONIINE.

HEMLOCK-TREE, or HEMLOCK SPRUCE. A name applied to the coniferous trees which belong to the genus Tsuga, especially to *Tsuga Canadensis*. This is a large, graceful tree with much the habit and appearance of some spruces. It is found from Nova Scotia to Alabama and Georgia, and west to Wisconsin and Minnesota. The leaves are one-half inch long, bright green above and silvery beneath. The cones, which have few thin bracts, are scarcely longer than the leaves. The wood, light, soft, brittle, and light-red in color, is extensively used in building. It warps badly when exposed. The bark is largely employed in tanning leather, for which purpose it is preferred and more extensively used than any other American product. Hemlock oil is distilled from the branches and leaves, and pitch is obtained from the trees. There are numerous cultivated varieties which are very ornamental, especially while the trees are young. *Tsuga Caroliniana* is a second species, which occurs locally in Virginia, North Carolina, and Georgia. Other species are found in Asia. See SPRUCE.

HEMP (AS. *henep*, OHG. *hanaf, hanof*, Ger. *Hanf;* connected with Lat. *cannabis*, Gk. κάνναβις, *kannabis*, OChurch Slav. *konoplya*, Lith. *kanapes*, hemp, and probably with Skt. *śana*, hemp), *Cannabis sativa*. A fibre plant of the natural order Urticaceæ (q.v.), which has the male and female flowers on different plants. There is only one known species of the genus, which varies considerably, however, in different soil, climate, and cultivation. It is an annual, a native of the warmer parts of Asia, but has been cultivated in Europe from the earliest historic times, and is now naturalized in many parts of Europe and America. Like flax, it adapts itself to diversities of climate, and is cultivated equally well under the burning sun of the tropics, and in the northern parts of Russia. It is, however, readily injured by frost, particularly when young; and in many countries where it is cultivated, it succeeds only because the summer is sufficiently long for its whole life. Hemp varies very much in height, according to the soil and climate; some-

times it is only three or four feet, sometimes fifteen or twenty feet. Notwithstanding the nettle-like coarseness of its leaves, it is an elegant plant, and is sometimes utilized in shrubberies and large flower borders. The stem is erect, more or less branched; the leaves are five to nine-fingered, the flowers yellowish-green, small, and numerous. It is hollow or filled with only a soft pith, surrounded by a tender brittle substance, consisting chiefly of cellular tissue, with some woody fibre, which is called the 'reed,' 'boon,' or 'shive' of hemp. Over this is the thin bark, composed chiefly of fibres extending parallel with the stalk, with an outer membrane or cuticle. The female plants are taller and stronger than the male.

Hemp is cultivated for its fibre in almost all countries in Europe; most extensively in the centre and south of European Russia, which is the chief hemp-exporting district. French hemp is much esteemed in the market, as is also that of England and Ireland, of which, however, the quantity is comparatively inconsiderable. Hemp is cultivated to some extent in the United States; especially Kentucky, Missouri, and Illinois. The production has been greatly reduced in the last quarter century, owing to the introduction of Manila hemp and jute. Limestone soils and alluvial soils are best adapted to this plant. It is very necessary to have the soil so rich, and to sow the seed at such a season, that the plants shall grow rapidly at first, as they thus form long fibres. Hemp sown thinly produces a coarser fibre than that sown thickly. It is not considered an exhaustive crop when the leaves of the plant and the shive or boon are returned to the land. As with flax, a thorough preparation of the soil is necessary. With the ground well prepared there is little trouble with weeds, as hemp occupies the entire ground. The crop is ready to cut when the first seeds are ripe, or about 100 days from planting. Cutting is done by a knife or by a heavy mower. The treatment of hemp by 'retting,' etc., is similar to that of flax (q.v.). It is usually dew-retted by spreading evenly over the ground to rot out the gums that hold the filaments together. The hemp-stalks are afterwards decorticated by hand beating or machinery and cleaned from the fibre by 'hackling.' The fibre is tied up into 'hands' and baled. The average yield of hemp-fibre is about 1000 pounds per acre. The fibre of hemp is generally used for coarser purposes than that of flax, particularly for sail-cloth, pack-sheet, ropes, and the calking of ships.

The seed of hemp is produced in great abundance. It is commonly sold as food for cage-birds; and birds are so fond of it that not only the ripening fields, but the newly sown ground, must be carefully guarded against their depredations. Hemp is cultivated in warm countries for a resinous secretion which has narcotic or intoxicating qualities. In India the resin is commonly known as churrus or charras. See HASHISH.

While strictly speaking the name hemp belongs to the plant *Cannabis sativa*, by common usage it is now applied to other fibre-plants that in a great measure supply the uses once filled by common hemp alone. These are designated as bowstring, Manila, Sisal, and Sunn hemp (see below). Many lesser known fibre-plants pass under the general name of hemp, though they vary widely in their botanical aspects and relations.

HEMP, BOWSTRING. The fibre produced by *Sansevieria* spp., a genus of Liliaceæ with representatives in tropical regions of both hemispheres. The employment of the fibre for making bowstrings led to this name. The plants are stemless perennials which grow wild in the jungles and increase by runners. The leaves, which yield readily to treatment in the fresh state, are thick and fleshy, sword or lance-shaped, and rich in fine lustrous fibre which ranges from two and one-half to seven feet in length, does not rot readily in water, and by experiment has been found to be the strongest and best-fitted fibre for deep-sea sounding. The plant, which is propagated readily from cuttings, requires a good rich soil in which, under favorable conditions, it will reach its full growth in one year. Ordinarily, however, it does not acquire its full size until the second season, and some species do not yield a crop until the third year. When once the land is stocked with it a full crop may be expected from the roots within twelve months after cutting. It does not appear to exhaust the soil materially, and will continue to make vigorous growth for a number of years in the same place. The yield is about 50 pounds of fibre per ton of green leaves. The total yield per acre has been reported by experiments to be nearly two and a-half tons of fibre annually.

HEMP, INDIAN. See HASHISH.

HEMP, MANILA, or ABACA. The fibre of a species of plantain or banana (*Musa textilis*), a native of the Philippine Islands, where it is extensively cultivated. It is most widely grown in the southern part of Luzon, and less extensively on the islands of Samar, Leyte, Cebu, and Mindanao. The fibre is white, easily separated, and very tenacious. The harder and stronger outer fibre is used for cordage, the finer inner fibres for weaving delicate fabrics, and the intermediate layers for manufacture of web-cloths and gauzes. From the finer sorts of the fibre, veils, crapes, robes, and women's hats of great beauty are made; also various articles of men's wear, as shirts and suitings of remarkable durability. Manila hemp is largely used in the United States for making binding twine and cordage. Manila cordage is now used for every purpose for which rope is employed. The best conditions for the growth of abaca are shade and abundant moisture, with good drainage. The finest growth is obtained on the slopes of the volcanic mountains. A new plantation is generally made of young shoots, which very quickly throw out suckers. Occasionally the plants are raised from seed. The cultivation of the plant is simple. Weeds and undergrowth must be kept down during the first season, but after that the plants will exterminate other growths. Plants raised from year-old seedlings need at least two years, while those raised from suckers require four years before they will produce fibre of value.

The abaca is cut just before flowering, near the roots, split open longitudinally, and the central peduncle separated from the sheathing layers of fibre. The fibrous coats are dried two or three days in the shade, and are then scraped until only the fibres remain. Two men will cut and scrape about twenty-five pounds of the fibre in a day. It takes about 3200 plants to produce a

FIBRE PLANTS

RAMIE BŒHMERIA NIVEA
2 JUTE CORCHORUS CAPSULARIS
4 BOWSTRING HEMP SANSEVIERIA ZEYLANICA
5 HEMP CANNABIS SATIVA
6 COTTON GOSSYPIUM HERBACEUM

ton of 2240 pounds of fibre. The yield is about one and one-third tons of fibre per acre annually. The output of abaca is fairly uniform under natural conditions. The exports for several years preceding the cession of the islands by Spain averaged about 100,000 tons annually.

HEMP, SISAL. The fibre of *Agave rigida sisalana*, order Amaryllideæ, native of Yucatan, Mexico, Central America, and West Indies, and closely related to the century plant. It has been introduced into the Bahamas and Florida. As a cordage fibre it is second only to Manila hemp in strength. Its straight smooth strands of fibre become white upon drying without washing. The plants yield best on a gravelly, rocky soil in comparatively arid districts only a few feet above the level of the sea. It thrives upon the Florida Keys, upon the almost naked coral rock, but will not thrive when even slightly shaded. Plants set out at 18 inches high from the nursery will produce leaves fit for cutting in three years. The life of a plant when undisturbed is six or seven years, after which it sends up its blossom-stalk and then dies. Cutting, however, extends its life fifteen to twenty years. No special cultivation is needed except that the land be kept clean and the suckers kept down. The cutting of the leaves is done in Yucatan by Indians, who use a heavy-bladed, sabre-like knife called a machete. The spine at the leaf-end is cut off and the leaves bundled for removal to the machines. On large plantations they are transported by steam-power over tramways which reach different parts of the estate. The fibre is separated from the fresh leaf by a specially constructed machine called a raspodor. The annual yield of fibre is from 1000 to 1470 pounds per acre, 50 to 70 pounds of fibre being derived from 1000 leaves.

HEMP, SUNN. The fibre derived from the bark of *Crotalaria juncea*, order Leguminosæ, a native of India. The plant has been in cultivation from time immemorial upon the high, sandy lands less suited for the more exacting crops. Seed is generally sown in April or May, and in August the plant, if grown for its fibre, is pulled or cut close to the ground, laid in long rows till the leaves begin to rot and separate from the stalks, which are then steeped in water for a few days, till the bark separates freely. The average yield is about 640 pounds of fibre per acre. The fibre is not so strong as hemp, but good cables, canvas, and cloth are made of it. It is now exported in considerable quantity, and is known by various names, as brown hemp, Bengal hemp, etc. Jubbulpore hemp (*Crotolaria tenuifolia*) is considered by some authorities to be a variety of *Crotalaria juncea*. See CROTALARIA.

HEMP-AGRIMONY. A European medicinal plant. See EUPATORIUM.

HEM'PEL, CHARLES JULIUS (1811-79). An American homeopathist. He was born at Solingen, in Prussia, and was educated there, at the University of Paris, and, after coming to the United States (1835), at New York University. In 1857 he became professor of materia medica at the Hahnemann Medical College in Philadelphia, and later practiced at Grand Rapids, Mich., where he died. A man of considerable literary ability, Hempel, who when a student in Paris had assisted in the preparation of Michelet's *Histoire de la France*, published translations of Hahnemann's *Chronic Diseases* (1846), and of Jahr's *Mental Diseases* (1853), as well as other homeopathic manuals. His most important works, however, were: *A System of Materia Medica and Therapeutics* (1859); *The Science of Homœopathy* (1874); and among several miscellaneous studies, *Christendom and Civilization* (1840).

HEMP-PALM (*Trachycarpus excelsus*). A palm of China and Japan, the fibre of the leaves of which is much employed in those countries for making cordage. Hats are also made of its leaves, and even cloaks and other garments for wet weather. See CHAMÆROPS.

HEMP-SEED OIL (*oleum cannabis*). An oil obtained from the seeds of the *Cannabis sativa*, or common hemp (q.v.). It has a mild odor, nauseating taste, and a greenish-yellow color which turns to brown with age. Its specific gravity at 15° C. is .9276. It is freely soluble in boiling alcohol. It has weaker drying properties than linseed, for which it is sometimes used as a substitute in making paints and varnishes. It is also used in soap manufacture. The seeds contain about 30 per cent. of oil. Consult Sadtler, *Industrial and Organic Chemistry* (Philadelphia, 1900).

HEMP'STEAD. A village in Nassau County, N. Y., about 20 miles east of New York City; on the Long Island Railroad (Map: New York, G 5). Its principal interests are in farming and market gardening, though there are some manufacturing establishments. The village is a popular suburb of New York, and has the Hempstead Institute. Camp Black was established here during the war with Spain, as an encampment for State troops. The water-works are owned by the municipality. Hempstead was settled by New Englanders in 1643. The Presbyterian Church, organized the following year, claims to be the oldest Presbyterian society in the country. Population, in 1900, 3582. Consult Onderdonk, *The Annals of Hempstead, 1643-1832* (Hempstead, 1878).

HEMPSTEAD. The county-seat of Waller County, Tex., 50 miles northwest of Houston; on the Houston and Texas Central Railroad (Map: Texas, G 4). It is an important shipping point, especially for garden truck, being situated in a farming and cotton-growing region, and has cotton-gins, cottonseed-oil mills, etc. Population, about 2000.

HEMS. A city in Asiatic Turkey. See HOMS.

HEMSEN. See HEMESSEN.

HEMSTERHUIS, hĕm'stēr-hois, FRANS (c.1721-90). A Dutch writer on moral philosophy and æsthetics. He was born at Groningen, the son of Tiberius Hemsterhuis; studied at the University of Leyden, and held a subordinate place in the Council of State of the United Provinces. He also devoted himself to literature and art, and especially to philosophy, and is classed with the sentimentalists of the eighteenth century. His chief works are: *Lettre sur la sculpture* (1769); *Lettre sur l'homme et ses rapports* (1772); *Aristée, ou de la divinité* (1778); and *Des facultés de l'âme* (1791).

HEMSTERHUIS, TIBERIUS (1685-1766). A celebrated Dutch philologist. He was born at Groningen, studied at the university there, and in 1704 was appointed professor of mathematics and philosophy at Amsterdam. In 1717 he was

made professor of Greek at Franeker, although he did not take up his residence there until three years later. In 1740 he received a call to the University of Leyden, where he remained until his death. One of the greatest Greek scholars of his time, he may be said to have created a new school of Greek philology, to which belong his distinguished pupils Ruhnken and Valckenaer. His editions of the *Onomasticon* of Pollux (2 vols., 1706), of the *Colloquia* of Lucian (1708 and 1732), and of the *Plutus* of Aristophanes (1744) are his principal literary works. From Hemsterhuis's manuscripts, *Anecdota Hemsterhusiana* (1825) have been edited by Geel, and *Orationes et Epistolæ* (1839) by Friedmann. Consult: Ruhnken, *Elogium Hemsterhusii* (Leyden, 1768; reprinted in the *Bibliotheca Teubneriana*); Lindemann, *Vitæ Duumvirorum T. Hemsterhusii et D. Ruhnkenii* (Leipzig, 1882), and Müller, *Geschichte der klassischen Philologie in den Niederlanden* (Leipzig, 1869).

HEN. See Fowl.

HÉNAULT, ā'nō', Charles Jean François (1685-1770). A French historian. He became president of the *cour d'equêtes* in 1710, and member of the French Academy in 1723. Later he was the head of the household of Maria Leszczynska, wife of Louis XV. He wrote much light and graceful verse, and some mediocre plays; but is best known for his excellent *Abrégé chronologique* (1744), the first successful attempt at a general history of France. His *Mémoires* (1854) are of value mainly because they contain interesting anecdotes of men of note in his day.

HENBANE (*Hyoscyamus*). A genus of plants of the natural order Solanaceæ, the members of which have a five-toothed calyx, an irregular funnel-shaped corolla, and a capsule which opens by a lid and is inclosed in the hardened calyx. The species are mostly annual and biennial herbs, natives of the Mediterranean region. The common henbane (*Hyoscyamus niger*) is not uncommon in waste places in the neighborhood of towns and villages in Europe, Northern Africa, Asia, and as an escape in the Eastern United States. It is also cultivated to some extent. It is an annual or biennial, somewhat bushy, one to four feet high, with large sinuated or sharply lobed leaves without leafstalks, and large, dingy yellow flowers, with brownish-red or purple veins. The whole plant is covered with clammy hairs, and has a nauseous smell, which gives warning of its strong narcotic, poisonous quality. Cases of poisoning by henbane are not rare, since its root somewhat resembles small parsnips. The seeds contain in largest quantity the peculiar alkaloid hyoscyamine, on which the properties of the plant chiefly depend. The symptoms of poisoning by henbane are similar to those produced by other narcotic poisons, and the proper treatment is the same as in cases of poisoning by opium. In medicine the leaves are commonly used internally. They are gathered and quickly dried when the plant is in full flower. Fomentations of henbane are applied to painful glandular swellings, parts affected with neuralgia, etc., and are often found to afford relief. Their action is almost the same as that of belladonna, and tincture and extract of henbane are often administered in cases of annoying cough, spasmodic asthma, and other diseases that seem to demand sedatives and anti-spasmodics. Henbane is also employed to calm mental irritation and to induce sleep. For many cases it has one great advantage over laudanum in not producing constipation. The other species of henbane possess similar properties. In Greece the dried stalks of *Hyoscyamus albus* are smoked to allay toothache.

HENCKE, hĕnk'e, Karl Ludwig (1793-1866). A German astronomer, born at Driesen, where he was long postmaster. He discovered the planetoids Astræa (1845) and Hebe (1847), and contributed some additions to previous lists of stellar magnitudes to Peter's *Zeitschrift für Astronomie* (1860) and the *Monthly Notes* of the Astronomical Society (1859).

HEN'DERSON. A city and the county-seat of Henderson County, Ky., 10 miles below Evansville, Ind., on the Ohio River, and on the Louisville and Nashville, the Illinois Central, and other railroads (Map: Kentucky, D 3). A magnificent bridge crosses the Ohio at this point. Among the attractions of the place are Atkinson Park, containing 100 acres, and the county fair grounds. The city has fine public school buildings, and owns a well-equipped sanatorium. Henderson controls an important trade in tobacco, corn, and wheat; and among its industrial establishments are cotton and woolen mills, grain-elevators, tobacco-stemmeries, hominy-mills, saw and planing mills, a furniture-factory, wagon-works, coal-mines, etc. First incorporated in 1797, the city is now governed under a charter of 1893, by a mayor, elected for four years and ineligible for a second term, and a common council, chosen by popular vote. The water-works, gas plant, and electric-light plant are owned and operated by the municipality. Population, in 1890, 8835; in 1900, 10,272.

HENDERSON. A town and the county-seat of Vance County, N. C., 44 miles north of Raleigh, on the Seaboard Air Line and the Southern railroads (Map: North Carolina, D 1). It carries on an important trade in tobacco and cotton, and has several extensive tobacco-warehouses, cotton-mills, knitting-mills, cottonseed-oil mills, buggy and wagon factories, etc. Settled in 1820, Henderson was first incorporated in 1842. Under a charter last revised in 1893, the government is vested in a mayor, biennially elected, and a municipal council. Population, in 1890, 4191; in 1900, 3746.

HENDERSON. The county-seat of Chester County, Tenn., 180 miles west southwest of Nashville; on the Mobile and Ohio Railroad (Map: Tennessee, C 5). It is the seat of the Georgia Robertson Christian College, and of the Vanderbilt Training School. Henderson is the centre of an agricultural region, and has some manufactures, and considerable cotton trade. Population, about 2000.

HENDERSON. The county-seat of Rusk County, Tex., 160 miles north by east of Houston; on a branch of the International and Great Northern Railroad (Map: Texas, G 3). It has a normal college. There are cotton-gins, a pottery, and other industries, and a trade in cotton, live stock, etc. Population, about 2000.

HENDERSON, Alexander (c.1583-1646). One of the greatest men in Scottish history, and, next to Knox, the most renowned ecclesiastic of Scotland. He was born in the Parish of Criech, Fifeshire, about 1583, and educated at Saint Andrews (M.A. 1603). He was presented to the

living of Leuchars (1614) by Archbishop Gladstanes, where he was for a time unpopular; but as he changed his views he became one of the most influential ministers of Scotland. In 1639 he was transferred to Edinburgh. He took an active part against Episcopal innovations, and was mainly responsible for the 'National Covenant,' which was publicly signed in Grey Friars Church, Edinburgh, 1638. During the troubled times of Charles I.'s reign Henderson's influence was felt in the negotiations for peace between the Scottish ecclesiastics and the Court, and when Charles visited Scotland in state (1641) Henderson attended him as chaplain, and later on went to Oxford to mediate between the King and Parliament. In 1643 Henderson was elected moderator for the third time in the General Assembly at Edinburgh, and in that capacity presented a draught of the famous 'Solemn League and Covenant,' an instrument against prelacy which was generally accepted by the Puritans. With Baillie, Rutherford, and others, Henderson represented Scotland in the Westminster Assembly, when the 'Solemn League,' with slight modifications, passed both Houses and became law for the two kingdoms. When in 1646 the King joined the Scottish army and retired with it to Newcastle, he sent for Henderson, and discussed the systems of Church government in a number of papers. Henderson died at Edinburgh, August 19, 1646, and his death was the occasion of a national mourning in Scotland. For his life, consult Aiton (Edinburgh, 1836).

HENDERSON, Andrew (c.1705-75). A Scottish maker and seller of books. He was born in Roxburghshire, and was educated at Aberdeen and in Edinburgh, where he afterwards was a high-school teacher, as well as a tutor in private noble families. He was in London when his first book was published, a translation of Voltaire's *Charles XII. of Sweden* (1734), but was back in his native land in time to witness the Jacobite uprising, and to describe it in *A History of the Rebellion, 1745 and 1746* (1748). He began his bookselling at Longacre, London, but continued to produce such histories as: *Frederick, King of Sweden* (1752); *William the Conqueror* (1764); memoirs: *Dr. Archibald Cameron* (1753); *Field-Marshal Leopold, Count Daun* (a French translation, 1757); and *Field-Marshal James Keith* (1758); as well as certain disputatious writing directed against the Bishop of Chester and Dr. Samuel Johnson, with a side thrust at Smollett. But his best book is said to be *The Life of William Augustus, Duke of Cumberland* (1766).

HENDERSON, Charles Hanford (1861—). An American educator, born in Philadelphia, and educated at the University of Pennsylvania and in Zürich. For two years (1883-85) he was lecturer at the Franklin Institute in Philadelphia, and then, after two years of editorial work, was appointed principal of the Philadelphia Manual Training High School (1892-96). In 1898 and 1899 he directed the Pratt Institute High School in Brooklyn. His publications include *The Elements of Physics* (1900), and many essays upon educational and social subjects.

HENDERSON, Charles Richmond (1848—). An American sociologist, born in Covington, Ind. He graduated at the University of Chicago in 1870, and received the degree of S.T.B. at Union Theological Seminary in 1873. From 1873 to 1883 he was pastor at Terre Haute, and from 1883 to 1892 at Detroit. In 1892 he was elected assistant professor of sociology at Chicago University, and afterwards was advanced to the full professorship. His principal works are: *An Introduction to the Study of the Dependent, Defective, and Delinquent Classes* (1898); *Social Elements* (1898); *Social Settlements* (1899). His discussions are practical rather than theoretical; and his works are characterized by a tone of healthy optimism.

HENDERSON, David Bremner (1840—). An American statesman, born at Old Deer, Aberdeenshire, Scotland. He went to Illinois in 1846, to Iowa in 1849, graduated at Upper Iowa University (Fayette, Iowa), studied law in an office at Dubuque, and was admitted to the bar in 1865. In 1861 he enlisted as a private in the Twelfth Regiment Iowa Volunteer Infantry, was elected and commissioned first lieutenant of Company C, and served until discharged, February 26, 1863, owing to the loss of a leg at the battle of Corinth. From May, 1863, to June, 1864, he was commissioner of the board of enrollment of the Third Iowa District, and then reëntered the army as colonel of the Forty-sixth Iowa Volunteer Infantry, in which rank he served to the close of the war. From 1865 until his resignation in 1869 he was collector of internal revenue for the Third Iowa District, in 1869 began to practice law as member of a Dubuque firm, and in 1869-71 was Assistant United States District Attorney for the Northern Division of the District of Iowa. He was elected to the Federal House of Representatives in 1882, as a Republican from the Third Iowa District, was chairman of the Committee on Judiciary, and a member of the Committee on Rules in the Fifty-fourth and Fifty-fifth Congresses, and in 1899, at the organization of the Fifty-sixth Congress, was elected to succeed T. B. Reed, resigned, as Speaker of the House. He was also chairman of the Iowa delegation at three national Republican conventions. In Congress he acquired reputation for his skill in debate, and the wise conduct of his important legislative office.

HENDERSON, Ebenezer (1784-1858). A Scotch missionary and linguist. He was born of poor and humble parents in Fifeshire, November 17, 1784. He worked as a clockmaker and shoemaker, but in 1803 entered Robert Haldane's seminary in Edinburgh and studied theology. He planned in 1805 to accompany the Rev. John Paterson to India; but as this did not prove practicable, he located at Elsinore, Denmark, and devoted himself to the distribution of Bibles in the Scandinavian countries. In the course of his labors he visited Sweden and Lapland, Iceland, Denmark, and Germany. In 1818 he accompanied Dr. Paterson through Russia as far as Tiflis, and until 1825, when the Russo-Greek Church induced the Czar to interdict the Bible Society, he resided at Saint Petersburg. Returning home, he was appointed tutor of the Mission College, Gosport, and from 1830 till 1850 was professor of Oriental languages in Highbury Congregational College. He died at Mortlake, May 16, 1858. His linguistic attainments were very great; he made himself acquainted not only with the ordinary languages of scholarship, but also with Hebrew, Syriac, Ethiopian, Russian, Arabic,

Tatar, Persian, Turkish, Armenian, Manchu, Mongolian, and Coptic. The first Bible society in Denmark was organized by him (1814); he was associated with the London Religious Tract Society and the Society for the Propagation of the Gospel Among the Jews. He published an account of his travels in Iceland (1818); Russia (1826); *The Vaudois: A Tour to the Valleys of Piedmont* (1845); several volumes of Bible annotations; enlarged Charles Buck's *Theological Dictionary* (1833); and edited numerous volumes of other writers. For his life, consult Henderson (London, 1859).

HENDERSON, James Pinckney (1808-58). An American soldier and political leader. He was born in Lincoln County, N. C.; practiced law in Mississippi, went to Texas in 1836, and served as brigadier-general during the revolution of that year. He was Secretary of State of the Texan Republic in 1837-39, was a minister to England and France to secure the recognition of Texan independence, and went to Washington in 1844 to secure annexation. He was a member of the Texas Constitutional Convention in 1845, and in the following year was elected first Governor of the State after annexation. He served in the Mexican War, and was presented with a sword by Congress. In 1857 he was appointed Senator from Texas as a State-Rights Democrat.

HENDERSON, John (1747-85). An English actor of Scotch descent, native of Cheapside, London. In Bath (1772) he made his début as Hamlet, was fairly successful in other Shakespearean rôles, and came to be known as 'Bath Roscius.' In 1777 he was acting at the Haymarket, London, and for the two following years was with Sheridan at Drury Lane, making himself famous as Shylock and Falstaff, besides creating characters in plays of Shirley, Cumberland, Jephson, and Mackenzie. He was engaged at Covent Garden from 1779 until his death, and was ever remembered gratefully by Mrs. Siddons, whom he had encouraged, and by many others of the profession, though Garrick was jealous of him, and he had earned the ill will of another actor-manager by his powers of mimicry. The deficiencies of Henderson's voice and person were overbalanced by the superior qualities of his mind, and he achieved special renown as a reader and a reciter of dramatic monologues. Gainsborough, his intimate friend, painted his picture, and there are portraits of him also by Stewart and Romney. He was buried in Westminster Abbey.

HENDERSON, Peter (1822-90). A Scotch-American horticulturist, born at Pathhead, Scotland. He came to America in 1843, and engaged in horticultural pursuits. In 1862 he opened a seed store in New York City, and in 1871 undertook the seed business on a large scale under the firm name of Peter Henderson & Co. He was not only very successful as a seed-merchant, but also did much to develop improved varieties of horticultural plants. He has been deservedly called 'the father of horticulture and ornamental gardening' in the United States. He wrote much for horticultural journals, and was the author of the epoch-making book entitled *Practical Floriculture* (1867), which has passed through many editions. Some of his other works are: *Gardening for Profit* (1866); *Gardening for Pleasure* (1875); and *Garden and Farm Topics* (1884).

HENDERSON, Richard (1734-85). An American pioneer, born in Hanover County, Va. He removed to Granville County, N. C., in 1762; studied law, was admitted to the bar, and in 1769 was appointed Associate Justice of the Superior Court. After the Declaration of Independence and the organization of the State Government in North Carolina, he was reëlected judge, but was prevented from accepting that position by his participation in a scheme organized under the name of the Transylvania Land Company, by which in 1775 the Cherokee Indians were induced to transfer to the company all the land lying between the Cumberland River, the Cumberland Mountains, and the Kentucky River, and situated south of the Ohio. This territory, half as large as the present State of Kentucky, was organized by Henderson and his associates into a political community, with president, legislature, and judges; but the State of Virginia annulled the purchase from the Indians, whose chiefs had signed the Treaty of Watoga for the purposes of the transfer. Nevertheless the enterprise and success of Henderson and his friends in colonization and settlement were rewarded by the Virginia Legislature with the grant of a tract of land twelve miles square on the Ohio River, below the mouth of Greene River. After a short residence in Nashville, Tenn., where he practiced law, he returned to North Carolina, and engaged in farming on a large scale.

HENDERSON, Thomas (1798-1844). A Scotch astronomer, born at Dundee, and educated at the academy of that city. He had to go to work at fifteen, but all his spare time was spent on astronomy. From 1819 to 1831 he was secretary to the Earl of Lauderdale and to Lord Jeffrey, and during this period became known to astronomers in Edinburgh and to the Royal Society of London. In 1831 he was made royal astronomer at the Cape of Good Hope, succeeding Fellows, but resigned two years later; was appointed astronomer royal for Scotland, professor of practical astronomy at Edinburgh, and director of the Calton Hill Observatory. He died at Edinburgh. Henderson wrote contributions, on the orbits of several comets, to the *Astronomische Nachrichten;* and published five volumes of his observations (1838-43; continued by Smyth, 1843-52). He is best known for his new method of calculating occultations (1824) and for his remarkable ability in astronomical computation.

HENDERSON, William James (1855—). An American musical critic and scholar, born at Newark, N. J. He is regarded as one of the most accomplished scholars in music in America, and is a frequent contributor to the leading magazines and reviews. He graduated from Princeton in 1876, and immediately began work as a journalist, serving in 1883 as a reporter, four years later as the musical critic of the New York *Times*, and in 1902 of the New York *Sun*. Later he received the appointment of lecturer on musical history in the New York College of Music. Besides writing the librettos to a number of light operas, he published: *What is Good Music?* (1898) and *How Music Developed* (1899), both of which are regarded as authorities. He also published *Preludes and Studies*, a story of music *The Orchestra and*

Orchestral Music (1902), and numerous other tales and stories.

HEN'DERSONVILLE. A town and the county-seat of Henderson County, N. C., 21 miles south of Asheville; on the Southern Railway (Map: North Carolina, B 4). It has a tannery, a furniture-factory, a lumber-yard, etc., and considerable trade in agricultural products, particularly potatoes, cabbages, and apples. The town enjoys considerable popularity as a summer resort. Population, in 1890, 1216; in 1900, 1917.

HEN'DON. A town in Middlesex, England, situated on the picturesque coach route from London to Saint Alban's, six miles northwest of Saint Pancras Station, London (Map: London, C 6). Population, in 1891, 15,800; in 1901, 22,450.

HEN'DRICKS, THOMAS ANDREWS (1819-85). An American politician. He was born near Zanesville, Ohio; was early taken by his parents to Indiana; graduated at South Hanover College in 1841, and two years later was admitted to the bar. He practiced his profession with success in Indiana; was a member of the Legislature and the State Constitutional Convention of 1851; and was a member of Congress from 1851 to 1855. He was United States Senator from 1863 to 1869, and in 1868 was a candidate for the Democratic nomination for President. In the next Presidential election, the Democratic candidate, Horace Greeley, having died before the casting of the electoral votes, they were given to Hendricks. He was Governor of Indiana from 1873 to 1877. He ran for Vice-President of the United States on the ticket with Samuel J. Tilden in 1876, and was elected Vice-President in 1884 on the ticket with Grover Cleveland, but died on November 25th of the following year.

HEN'DRICKSON, GEORGE LINCOLN (1865—). An American Latinist, born at Winchester, Ill. He was educated at Beloit College, the Johns Hopkins University, and the universities of Bonn and Berlin. From 1891 to 1896 he was professor of Latin at the University of Wisconsin, and in 1897 was appointed to a similar chair at the University of Chicago. His writings include frequent contributions to the *American Journal of Philology* on subjects relating to the history of Latin literature.

HENGEST, hĕng'gĕst, or **HENGIST AND HOR'SA.** The legendary leaders of the first Germanic invaders of Britain. About 449 A.D. a band of Jutes landed at Ebbsfleet on the island of Thanet. They came from the peninsula now called Jutland, and, according to tradition, were in three vessels. Tradition has assigned to their leaders the names of Hengest and Horsa, one meaning the horse and the other the mare. It is now generally held that these names are mythical. This point of view is confirmed by the fact that Hengest is the name assigned to the hero of many different traditions. The cromlech called 'Wayland Smithy' has sometimes been designated as a monument to Hengest and Horsa. Consult Elton, *Origins of English History* (London, 1882). See ANGLO-SAXONS.

HENGSTENBERG, hĕng'sten-bĕrk, ERNST WILHELM (1802-69). The leader of the Conservative School of theologians in Germany during the first half of the nineteenth century. He was born in Westphalia, October 20, 1802, the son of a clergyman. He studied at Bonn and became tutor in Basel (1823-24). Going to Berlin in 1824 as privat-docent, he put himself at the head of a rising orthodox school, and, with most conscientious devotedness, made the scientific defense of their principles the aim of his labors in the university and through the press. He was made professor extraordinary in 1826, and full professor in 1828. As editor of the *Evangelische Kirchenzeitung*, begun in 1827, he combated rationalism even in its mildest forms, seeking to restore the orthodoxy and Church discipline of the sixteenth and seventeenth centuries. With the same view were written all his principal works: *Christologie des alten Testaments* (1829-35; 2d ed. 1854-57); *Beiträge zur Einleitung ins alte Testament* (1831-39); *Kommentar über die Psalmen* (1842-45; 2d ed. 1850); *Das Hohelied Salomonis ausgelegt* (1853); and others devoted to the defense of the old interpretation and criticism of the Scriptures against the results of modern biblical science. Hengstenberg's influence in ecclesiastical matters also was employed in carrying out the high Lutheran dogmas of the Church, of Church offices, and of the sacraments, by persecution of sectaries, by opposition to the union of Lutherans and Reformed, and by attempts to depose from their chairs Gesenius, Wegscheider, De Wette, and other rationalistic teachers in the universities. He died in Berlin, May 28, 1869. Among his later works were: *Die Weissagungen des Propheten Ezekiel* (1867-68); *Geschichte des Reiches Gottes unter dem alten Bunde* (1869-71); *Das Buch Hiob erläutert* (1870-75). Most of his exegetical and critical works have been translated. For his life, consult Bachmann and Schmalenbach (Gütersloh, 1876-92).

HEN-HARRIER. See HEN-HAWK.

HEN-HAWK, HEN-HARRIER, or CHICKEN-HAWK. A hawk which attacks poultry. This definition includes an extensive list and variety of birds of prey, if the entire English-speaking world is considered, and the accusation is not always a fair one, as the offense is occasional rather than habitual with many of the birds against which it is charged. The term 'hen-harrier' is British, and belongs to the subfamily Circinæ, represented in the United States by the innocent marsh-hawk (q.v.). Many of the eagles and larger falcons, as well as some of the smaller ones, do now and then swoop upon domestic fowls; yet these robberies constitute only a small proportion of their food, which mainly consists of small mammals, frogs, grasshoppers, and other insects. In certain places, the smaller falcons may become a serious local nuisance to the poultry-keeper, especially in winter; but in general the harm they do is far more than compensated for by their service to agriculturists in destroying injurious rodents and insects. The miscellaneous destruction of hawks and owls is therefore unwise. The species commonly called hen-hawks include two birds, the red-tailed and the red-shouldered hawk. See BUZZARD.

RED-TAILED HAWK. The redtail (*Buteo borealis*) is one of the largest, most numerous, and most widely distributed of North American buzzard-hawks. It is from 19 to 25 inches long, and its spread of wings is from 49 to 58 inches. In maturity the upper surface is blackish-brown, variegated with whitish and dull rust-color, the last tint growing brighter on the upper surface

of the tail, which has a blackish cross-band near the end. The under surface of the body is buffy white, the belly marked with dark streaks. Young specimens show a dark zone across the lower part of the breast, and from six to ten regular dark bands across the gray tail. Western specimens vary a good deal, and were described as separate species by early writers. The majority of them leave the Northern States in winter, and migrate in large flocks. They build their nests in tall trees. Their food includes all the mammals from the size of a squirrel downward, and all sorts of birds from grouse and rails to sparrows; but this larger game is far outnumbered by the smaller gophers, mice, frogs, insects, and carrion upon which they principally subsist. Fisher declares that it has been demonstrated by careful examination of stomachs that poultry and game birds do not constitute more than 10 per cent. of the food of this bird.

Red-Shouldered Hawk. This species (*Buteo lineatus*) is rather less in size than the redtail, and generally more reddish in plumage, especially bright on the shoulders, while the lower parts (whitish in the young) are everywhere rusty in color, transversely barred with a darker tint. The tail is black, covered by about six bands of white. It is a rather heavy, sluggish bird, and lives throughout the year south of the Great Lakes, frequenting lowlands and marshes, except in the spring, when it retires to the woods for breeding purposes. The great tree-built nest is often begun before the end of February. This hawk's diet is exceedingly varied, and includes a larger proportion of frogs and snakes than the redtail's. It preys principally on mice, however, and almost never attacks poultry, so that its reputation as a hen-hawk is undeserved. On the contrary, its work is of the highest benefit to farmers, who should carefully preserve it. A similar species, Swainson's hawk, of the Western interior, is equally beneficial and worthy of protection because of the great numbers of gophers, locusts, and the like it kills at all seasons.

Chicken-Hawks. Under this head may be mentioned a few of the smaller destructive falcons. The goshawk and gyrfalcon (qq.v.) are so rare that the harm resulting from them is small. The sharp-shinned hawk (*Accipiter velox*) is a true falcon, and inhabits all of North America, migrating annually from the northern districts to the warmer parts. It is about a foot long. Its pointed wings stretch about two feet, and they enable it to fly with extreme swiftness and power. In color it is uniformly grayish above, darker on the crown, and the tail is crossed by several blackish bands; below, the surface is white, with breast and sides barred dusky or rufous. It takes its name from the sharp front of the tarsi. Its courage and boldness are admirable, but they are unfortunately directed mainly against birds, which constitute almost all of its food. Where it settles on a farm it lives upon young chickens, since these are more easily caught than wild birds; and it stays in the neighborhood until it is killed or the supply of poultry is exhausted. It is to be noted in its favor, however, that it preys persistently upon the English sparrows. Cooper's hawk (*Accipiter Cooperi*) is nearly twice as large as the sharpshin, but closely resembles it in color. It is not found much north of the Saint Lawrence and Saskatchewan valleys, and in winter retreats south of the middle part of the United States. Like the sharpshin, it feeds mainly upon birds, and is destructive to English sparrows and poultry, with a special fondness for domestic pigeons. These two smaller falcons, and certain owls, are responsible for most of the evil reputation attaching to the hawk tribe in the minds of undiscriminating poultry-keepers.

Bibliography. Fisher, *Hawks and Owls of the United States* (Washington, 1893).

HENKE, hĕnk'*e*, Heinrich Philipp Konrad (1752-1809). A German Protestant ecclesiastical historian, born at Hehlen. He was educated at Brunswick and at Helmstedt, where in 1778 he became professor of theology. He is best known as author of a valuable *Allgemeine Geschichte der christlichen Kirche* (1795-1806). Consult the biography by Wolff and Bollmann (Helmstedt, 1816).—His youngest son, Ernst Ludwig Theodor Henke (1804-72), born at Helmstedt, was also a Church historian. In 1833 he became professor at Jena, and in 1843 at Marburg, where six years afterwards he was appointed supervisor of the Theological Seminary. His works include: *Georg Calixtus und seine Zeit* (1853-60); *Papst Pius VII.* (1860); and *Konrad von Marburg* (1861). For his biography, consult Mangold (Marburg, 1879).

HENLE, hĕn'*le*, Friedrich Gustav Jakob (1809-85). A German physiologist and anatomist, born at Fürth. He studied at Bonn and Heidelberg (1827-32), and then became assistant to Rudolphi in the anatomical museum at Berlin, and in 1834 demonstrator of anatomy under Johann Müller. Three years later he became privat-docent in Berlin, and made a specialty of microscopic anatomy and pathology. From 1840 to 1844 he was professor of anatomy and physiology at Zurich, and in the latter year went to Heidelberg as professor of anatomy. At this time he wrote *Handbuch der rationellen Pathologie* (3d ed. 1855), which put him in the first rank of the members of the rational-physiological school. His most important work was *Handbuch der systematischen Anatomie des Menschen* (3d ed. 1876-79), in connection with which he issued *Anatomischer Handatlas zum Gebrauch im Seciersaal* (3d ed. 1895-96). Henle's other works include: *Pathologische Untersuchungen* (1840); *Handbuch der allgemeinen Anatomie* (1841); *Grundriss der Anatomie des Menschen, mit Atlas* (4th ed. 1901). He also wrote yearly reviews on pathology and anatomy for Müller's *Archiv* (1838-42), and on anatomy in general in Cannstatt's *Jahresbericht* (1844-55). In 1841 he founded with Pfeufer the *Zeitschrift für rationelle Medizin.* For his life, consult Merkel (Brunswick, 1891).

HEN'LEY, John (1692-1756), commonly known as Orator Henley. An eccentric English clergyman, son of Rev. Simon Henley. He was born at Melton Mowbray, Leicestershire, and educated at Saint John's College, Cambridge. While an undergraduate, he sent a witty letter to the *Spectator* (1712). After leaving the university, he became headmaster of the grammar school of his native town. He was also ordained, and held for some time a curacy there. In 1714 he published a rhetorical poem entitled *Esther, Queen of Persia.* He also compiled at this period a grammar of seven languages called *The Complete Linguist* (1719-21). Removing to London, he was appointed reader at the Church of Saint Joseph the Martyr. He found it agreeable to re-

tire, in 1724, to the rectory of Chelmondiston, in Suffolk. Again, his talents not being appreciated, he left the Church, and returned to London, where he opened, in 1726, his famous oratory in Newport Market, above the market-house. He preached on Sundays and lectured on Wednesdays. His pompous elocution and his strange service drew for a time large congregations. He struck medals of admission to his hall, bearing the device of a star rising to the meridian with the motto, *Ad summa,* and below, *Inveniam viam aut faciam.* His pulpit was covered with velvet and adorned with gold, and over his altar was raised the inscription, 'The Primitive Eucharist.' In 1730 he became a pensioner of Walpole, editing for him the rather disreputable periodical called the *Hyp Doctor.* He was ridiculed by Pope, and he furnished the subject for two plates by Hogarth. Fifty manuscript volumes of his lectures were deposited in the British Museum.

HENLEY, Robert, Earl of Northington. See Northington.

HENLEY, Walter de. An English friar and author of the thirteenth century. He wrote in French a work called *Hosebandri,* which for two centuries was the best treatise on the subject. The book was several times translated into Latin and English, and once into Welsh. A unique copy of an English version is in the possession of the Cambridge University Library.

HENLEY, William Ernest (1849-1903). An English author and editor, born at Gloucester. He was educated at the Crypt Grammar School at Gloucester. While ill at a hospital in Edinburgh in 1874—which experience he afterwards embodied in *Hospital Rhymes*—he met Robert Louis Stevenson, and the two men, in many ways alike, were intimate friends for thirteen years. Together they wrote the plays, *Deacon Brodie* (1879); *Beau Austin,* an admirable comedy; *Admiral Guinea;* and *Robert Macaire;* and Stevenson contributed to several of Henley's publications. Henley edited *London* (1877-78); the *Magazine of Art* (1882-86); the *Scots Observer,* which was transferred to London as the *National Observer* (1888-93); and the *New Review* (1893-98). There has been adverse criticism of Henley for his arraignment of Balfour's *Life of Stevenson,* which he claimed did not give a true idea of his friend's character. He has also been criticised for his point of view in the essay on Burns, *The Centenary Burns* (1897), with T. F. Henderson (terminal essay by W. E. H., reprinted as *The Life, Genius, and Achievement of Robert Burns* in 1898). He was strong in his likes and dislikes, and arrogant, even aggressive, in his statement of them. But the brilliant style, the acute insight, the technique, the pungent felicitous wit, make the work a *tour de force* of criticism. His *Views and Reviews, Literature* (1900), and *Views and Reviews, Painting and Sculpture* (1901), are collected from previous publications. They show primarily his own personality, but they are never commonplace and never dull. His learning is solid, whether he touches on literature or art; and he is always suggestive. As a poet, Henley belongs to the 'fleshly school.' In subject and treatment he is essentially modern and original. Perhaps his most characteristic work is *London Voluntaries* (in *Song of the Sword,* 1898). His poetry, like his prose, is egotistical. Sometimes his imagery is grotesque, and his humor of the grimmest, but he had the gift of original and powerful expression. He edited *Lyra Heroica* (1892); *A London Garland* (1895); *English Lyrics* (1897); *The Works of Lord Byron* (1897); *The Poetry of Wilfrid Blunt* (1898, with George Wyndham); and wrote *London Types* (1898, with W. Nicholson); *A Book of Verses* (1888); *Poems* (1898); *For England's Sake* (1900); *Hawthorn and Lavender, and Other Verses* (1901); and *Shakespeare, the Edinburgh Folio* (1901).

HENLEY-ON-THAMES. A town in Oxfordshire, England, on the left bank of the Thames; 35 miles west of London. It is a favorite boating and angling resort, famous for the annual regatta held here since 1839, in which crews from the universities participate (Map: England, E 5). American colleges are frequently represented. An elegant stone bridge which spans the Thames, the old parish church, grammar school, town hall, library and reading-rooms, are prominent features. Henley dates from the Roman occupation and received a charter of incorporation from Elizabeth. Population, in 1891, 4900; in 1901, 5984. Consult Burn, *History of Henley-on-Thames* (London, 1861).

HENLEY REGATTA. The most famous open rowing contest in the world, held annually at Henley-on-Thames, during the month of July. It lasts for three days, during which the gathering of a brilliant assemblage makes the river and its banks a scene of the utmost picturesqueness. In 1829 this course was chosen for rowing contests between Oxford and Cambridge; and in June, 1839, the first regatta was held. The course is one mile 550 yards in length; owing to the narrowness of the river, all races are rowed in heats of only two boats at a time. The events, which are open to all amateurs, English and foreign, are the Grand Challenge Cup, Ladies' Plate, Thames Challenge Cup for eight-oars; Stewards', Visitors', and Wyfold Challenge Cups for four-oars; Silver Goblets (Nickalls Challenge Cup) for pairs; and the Diamond Sculls for single scullers. Toward the close of the nineteenth century the purely amateur character of the regatta was threatened by the increasing participation of crews trained by professional coaches, and competing with all the advantages of professionalism. This gave rise to considerable agitation, and a strong demand on the part of some of the English rowing clubs for the exclusion of foreign crews. The culmination of the agitation occurred in 1902, when a regulation was enacted which prohibited all competing crews and individuals from the enjoyment of a professional coach for a period of thirty days immediately preceding the race or regatta.

HENLO'PEN, Cape. See Cape Henlopen.

HENNA, or **HINNA** (Ar. *ḥinnā',* from *ḥa-na'a,* to be green). A name given to *Lawsonia alba,* a shrub of the natural order Lythraceæ. The species was formerly divided into *Lawsonia inermis* and *Lawsonia spinosa,* but both are now grouped under *Lawsonia alba,* the only species. They differed in little but that the one is unarmed and the other thorny, the latter being also the larger plant. Henna grows in moist situations throughout the north of Africa, Arabia, Persia, and the East Indies. It is cultivated in many places for the sake of its flowers, which

are much prized for their fragrance, particularly by the Egyptian ladies; but still more for the sake of the leaves, which abound in coloring matter, and which, being dried, powdered, and made into a paste with hot water and catechu, are very generally employed by women throughout the East to stain the nails and tips of the fingers of an orange color; also by men to dye their beards, the orange color being converted into a deep black by indigo; and for dyeing the manes and hoofs of horses, and to dye skins and leather reddish-yellow. Powdered henna-leaves form a large article of export from Egypt to Persia, and to various parts of Turkey, from which they find their way to more northern countries, and even to Germany, to be employed in dyeing furs and some kinds of leather. The use of henna for staining the nails appears to have prevailed from very ancient times. See ALKANET.

HENNE-AM-RHYN, hĕn'*ne* åm rēn, OTTO (1828—). A Swiss-German historian of civilization. He was born at Saint Gall in Switzerland, and was the son of Anton Henne, a Swiss historian and poet. He studied at Bern, and after holding several positions as teacher and archivist in Switzerland, went in 1872 to Leipzig, where he was editor of the *Freimaurerzeitung.* From 1882 to 1885 he lectured in the University of Zurich, and since 1885 he has been State archivist at Saint Gall. He wrote: *Geschichte des Schweizervolks und seiner Kultur* (last ed. 1879); *Kulturgeschichte der neuern Zeit* (1870-72); *Die deutsche Volkssage* (1879); *Allgemeine Kulturgeschichte von der Urzeit bis zur Gegenwart* (1877-97); *Kulturgeschichte des Judentums* (2d ed. under the title *Kulturgeschichte des jüdischen Volks,* 1892); *Das Jenseits* (1881); *Die Kreuzzüge und die Kultur ihrer Zeit* (1883-84); *Kulturgeschichte des deutschen Volks* (last ed. 1898); *Die Kultur der Vergangenheit, Gegenwart und Zukunft* (last ed. 1892); *Die nationale Einigung der Deutschen* (1891); *Das Christentum und der Fortschritt* (1892); *Die Frau in der Kulturgeschichte* (1892); *Die Gebrechen und Sünden der Sittenpolizei* (last ed. 1897); *Geschichte des Rittertums* (1893); *Die Freimaurer* (1894); *Die Jesuiten* (3d ed. 1894); *Aria, das Reich des ewigen Friedens im 20. Jahrh. Ein Zukunftsbild* (1895); *Handbuch der Kulturgeschichte* (1900-01). His autobiography appeared in *Deutsche Denker,* vol. viii. (Danzig, 1890).

HENNEBERG, hĕn'ne-bĕrk, WILHELM (1825-90). A German agricultural chemist, born at Wasserleben. He was educated at Brunswick, Jena, Giessen, the agricultural college at Badersleben, and in England. In 1853 he founded at Celle the *Journal für Landwirtschaft;* four years later he was appointed director of the new experimental station near Göttingen, and in 1865 professor in the university. The founder of a new school of agricultural chemistry, especially in the matter of pasturage, he wrote, with Stohmann, *Beiträge zur Begründung einer rationellen Fütterung der Wiederkäuer* (1860-64), and *Neue Beiträge* (1870-71).

HENNEGAU, hĕn'ne-gou. See HAINAULT.

HENNEPIN, ĕn'păn', LOUIS (c.1640-c.1706). A Belgian missionary and explorer in America. He was born at Ath, in Hainault, and at an early age joined the Recollet branch of the Franciscan Order, becoming a successful preacher in Belgium and Northern France. In 1675 he embarked for Canada in the same ship with La Salle, the explorer, and Bishop Laval, of Quebec. The next year he was in the Indian mission of Fort Frontenac, and visited the Mohawk country. In 1678 he accompanied La Salle's expedition to Niagara and the upper lakes, and constructed a vessel in which they proceeded by the Erie, Huron, and Michigan lakes to Saint Joseph's River, which they navigated in canoes. Reaching the Illinois, they built Fort Crèvecœur. Here La Salle left them, and Hennepin and his party proceeded down the Illinois to the Mississippi. They were captured by the Sioux and carried up the Mississippi, but were soon released, and Hennepin returned to Quebec. During this journey Hennepin discovered the Falls of Saint Anthony, July 3, 1680, and one of his party penetrated as far as Lake Superior. Hennepin soon after sailed for France, where he published his *Description de la Louisiane* (1683-84), containing an account of La Salle's expedition and of the missionary's own discoveries. Hennepin refused to return to America, though ordered to do so by his superiors of the Church, and took refuge in Holland. After La Salle's death Hennepin published his *Nouvelle découverte d'un très grand pays situé dans l'Amérique.* In this he claimed to have been the first man to descend to the mouth of the Mississippi—a statement which was easily proved to be false. His works won great popularity and were translated into several languages. Hennepin died at Utrecht about the year 1706. For his life and discoveries, consult: Saint-Genois, *Les voyageurs belges du XIII. au XIX. siècle* (Brussels, 1867); Van Hulet, *Notice sur le père Louis Hennepin* (Liège, 1845); Shea, *Discovery of the Mississippi* (New York, 1852); Parkman, *La Salle and the Discovery of the Great West* (12th ed., Boston, 1887); Winsor, *Narrative and Critical History of America,* vol. iv. (Boston, 1884), contains a full account of Hennepin.

HENNEQUIN, ĕn'kăn', ALFRED (1842-87). A French dramatist, born at Liège, Belgium. He was a pupil at the school of mines in his native town, and practiced engineering, but after 1875 confined himself to play-writing. His early works include: *J'attends mon oncle* (1869), and *Les troix chapeaux* (1870). His first Parisian success was *Le procès Vauradieux* (1875). This was followed by *Les dominos roses* (with Delacour, 1876); *Bébé* (with Najac, 1877); and *Nounou* (1879); *Niniche* (1878); *Lili* (1880); *La femme à papa* (1885), the last three in collaboration with Albert Millaud, and many other gay, daring comedies.

HENNET, ĕ'nå', CHEVALIER ALBERT JOSEPH ULPIEN (1758-1828). A French economist, born at Maubeuge. When he was nineteen he became supernumerary in the Ministry of Finance under Necker, and, although a royalist at heart, acted with such prudence through both Republic and Empire that he became chief commissioner of finance, and held that post from 1813 to 1816. He is well known for his work on finance, including *Théorie du crédit public* (1816), and *Essai d'un plan des finances* (1816), which, however, are largely colored by his partisan views, and also wrote a *Cours d'astronomie* (1820), and some critical work, of which *La poétique anglaise* (1806) may be mentioned.

HENNIGES VON TREFFENFELD, hĕ′nê-gĕs fŏn trĕf′fĕn-fĕlt. JOACHIM (c.1625-88). A Brandenburg general. He especially distinguished himself in Alsace (1674); was the first to be ennobled by the Elector of Brandenburg; and in 1679 was promoted to the rank of general for his defeat of the Swedish Army near Tilsit. For his biography, consult: Kessel (Stendal, 1863), and Bussler (Gotha, 1897).

HEN′NINGSEN, CHARLES FREDERICK (1815-77). An English soldier of fortune and man of letters. In 1834 he took service in the Russian Army. He joined Kossuth in the Hungarian revolt, came to the United States, and fought with Walker in Nicaragua. At the outbreak of the Civil War he entered the Confederate Army as a colonel. He was promoted to be brigadier-general, and directed the manufacture of the first Minié rifles made in this country. He was the author of *Revelations of Russia* (1845); *The Past and Future of Hungary* (1852); and several other works, published chiefly in England.

HENOCH, hā′nŏG, EDUARD HEINRICH (1820—). A German physician, born and educated at Berlin, where he became privat-docent in 1850 and professor eight years later. Associated with Romberg at the Polyclinic, he edited that physician's *Klinische Ergebnisse* (1846). In 1872 he became director of the clinic for children's diseases in the Royal Charité, and retired in 1893. He wrote: *Klinik der Unterleibskrankheiten* (3d ed. 1863); *Beiträge zur Kinderheilkunde* (1861-68); and the well-known *Vorlesungen über Kinderkrankheiten* (10th ed. 1899).

HEN′OTHEISM (from Gk. εἷς, *heis*, one + θεός, *theos*, god). A term used to denote a tendency of the Vedic poets to attribute to a deity especially lauded at a given time the attributes of any other god or of the whole body of gods. This tendency is doubtless more apparent than real. It was but natural that in a hymn to Indra or to Agni the thought of the bard should be focused on the deity in question so that special honors and powers should be assigned him, whichever god he might be. Again, as the religion of the Vedic period was preëminently a nature-worship, it is probable that the changes of the seasons led to the apparent exaltation of certain divinities at one time of the year, and to their apparent dethronement at another time. In this way the so-called henotheism with regard to the various aspects of the sun-god (Sūrya) and of the storm-god (Indra) receives at least a partial solution. There was consequently no constant lord of the Vedic pantheon until the rise of the philosophical speculations which characterized the close of the Vedic age. It must also be borne in mind that expressions of laudation, which, taken by themselves, seem exaggerated, are almost invariably checked by the context in the Veda. The origin of henotheism is based on the syncretistic trend of the Hindu mind. It is noteworthy that it is the later deities especially who are treated henotheistically, and herein lies the key to the problem. The Vedic poets, long before the Rig Veda had been completed, rising in their religious concepts from a low stage of nature-worship and crematheism, or worship of material objects, especially useful ones, identified each and every god, and at a later age all living creatures and all things, with the All-Soul (called Atman, Brahma, etc.). Each god being therefore a phase of the supreme deity, and not a distinct divinity, might receive as the temporary representative of the All-Soul precisely the same attributes as any other god, controlled, however, by the traditional views held by the priests or the people concerning him.

The same religious phenomenon occurs elsewhere, as in the philosophical aspects of Greek religion. The term is sometimes used to denote the conception of a special god for each nation or tribe. Nowhere else, however, does henotheism become a distinctive trait of the faith as it did in India. After the close of the Rig-Vedic period it practically vanishes, since by that time the esoteric unitarianism on which it was based had permeated the entire body of the religious and philosophical thought of India. As a term henotheism is scarcely a fortunate one, and many scholars prefer to call the religious impulse syncretism instead. Consult Hopkins, "Henotheism in the Rig-Veda," in *Classical Studies in Honor of Henry Drisler* (New York, 1894).

HEN′RI, ROBERT (1865—). An American landscape and portrait painter, born in Philadelphia, Pa. He studied in his native city, and for several years was a teacher in the Philadelphia School of Design. His pictures have been received at both Salons, and his "Snow" (1899) is in the Luxembourg. While in Paris he established a studio at which several of the 'Glasgow School' received valuable instruction. His landscapes are broadly painted and vigorous. Especially noticeable are the cloud effects in such pictures as "A Sudden Shower," and "Cumulus Clouds, East River." His "Figure of a Girl" (1902) is a strong and individual example of his skill as a portraitist.

HENRI III. ET SA COUR, äN′rē′ trwä à sà kōōr (Fr., Henry III. and his Court). A prose drama by the elder Dumas, produced February 11, 1829. With it he was supposed to found the Romantic School of the drama; but he denies this in the preface of the play, giving that honor to Hugo, Mérimée, Vitet, and others.

HENRIADE, äN′rê-ăd′, LA. An epic poem of ten cantos in Alexandrine couplets, by Voltaire, begun during his confinement in the Bastille in 1717, and first printed at Rouen in the winter of 1722-23 under the title *Poème de la Ligue.* During the author's English exile (1726-29) he published the *Henriade* by subscription (1728) with a dedication to Queen Caroline, "not only as the protectress of arts and sciences, but as the best judge of them." A number of editions followed in England, Holland, and France, where the work, in spite of its political theories and attacks on religion, was generally admired. The poem, by picturing religious wars, sought to inspire a hatred of fanaticism and intolerance. It lacks sentiment and poetic imagination, but is important on historical and philosophical grounds.

HENRICI, hĕn-rē′tsê, CHRISTIAN FRIEDRICH (1700-64). A German poet (also called 'Picander'), born at Stolpen, near Dresden, and educated at Wittenberg and Leipzig. His ability as a poet, it seems, won him first a place in the Postal Department, and then an office as an excise and tax collector. His poetry includes the *Ernstscherzhafte und satyrische Gedichte* (1727-37); the *Sammlung vermischter Gedichte* (1768); and the *Teutsche Schauspiele* (1726), which are

very obscene, but none the less valuable as a picture of contemporary life, especially at the universities. His devotional poetry includes many verses for the compositions of Johann Sebastian Bach, especially his passion music; and, among other hymns, *Wer weiss, wie nahe mir mein Ende.* Consult Flossman, *Picander* (Leipzig, 1899).

HENRICIANS, hĕn-rĭsh′anz, or **HENRICANS.** The followers of Henry of Lausanne, or Henry the Deacon. Grieved at the corruption of the times, Henry left the Benedictine monastery of Clugny, to which he belonged, in Southern France. His consistent life and the eloquence of his discourses deeply moved the people. At first Hildebert, his bishop, favored him, but afterwards drove him from Le Mans. Joining the disciples of Peter of Bruys (see BRUYS, PIERRE DE) in Provence, he was arrested by the Archbishop of Arles, and at the second Council of Pisa (1135) was declared a heretic and placed in a cell. Subsequently released, he again went to the south of France, where he had a great influence over the lower classes. He was arrested by Pope Eugenius III., and at the Council of Rheims (1148) condemned to perpetual imprisonment. He died in prison in 1149.

HEN′RIET′TA. A town and the county-seat of Clay County, Tex., 96 miles northwest of Fort Worth; on the Little Wichita River, and on the Fort Worth and Denver City and the Missouri, Kansas and Texas railroads (Map: Texas, E 3). As the centre of an agricultural and stock-raising country, Henrietta has a considerable trade in grain and live stock; and among its industrial establishments are grain-elevators, flour-mills, cotton-gins, lumber-yards, etc. Building-stone is quarried in the vicinity. Population, in 1890, 2100; in 1900, 1614.

HENRIETTE, äN′rē′ĕt′. The simple, unaffected *ingénue* in Molière's *Femmes Savantes,* whose pedantic mother and sister give the title to the play. She marries Clitandre in spite of all Armande's machination; and is considered the truest type of womanliness on the French stage.

HENRIOT, äN′rē′ō′, FRANÇOIS (1761-94). A French politician, born at Nanterre. He was educated as a choir-boy, and little is known of him until 1789, when he left his post in the city employ and joined the *sans-culottes,* who made him one of their commanders. He was a leader in the massacres of the Carmes and Saint Firmin (1792), and in the following year was appointed by the Commune provisional general of the army in Paris. A year later he resigned from this post, and was elected general of the National Guard three weeks afterwards, but refused to 'command the army against the people.' In 1794 his arrest was ordered on the suggestion of Tallien and Delmas; he made a bold attempt to rouse the mob in his behalf, but was taken and guillotined with Robespierre.

HENRIQUEL-DUPONT, äN′rē′kĕl′ dü′pôN′, LOUIS PIERRE (1797-1892). A French designer and engraver. He was born in Paris, June 13, 1797. After studying in the Ecole des Beaux-Arts he entered the studio of Pierre Guérin (q.v.), and after remaining there three years turned his attention to engraving under Bervic. His first production, the "Portrait of a Young Woman with Her Infant," gained the second medal at the exhibition of 1822. He produced in succession a "Portrait of M. de Pastoret;" "Strafford;" "The Interment of Christ," after Paul Delaroche; "The Abdication of Gustavus Vasa," after Hersent; "The Disciples at Emmaus," after Paul Veronese; "The Marriage of Saint Catharine," after Correggio; and other works. Ten years of his life were employed in reproducing the "Hemicycle" of Paul Delaroche (q.v.). He was considered the most eminent French engraver of the day; his work is characterized by accuracy of design and purity of style. He became member of the Academy in 1849, and professor at the Ecole des Beaux-Arts in 1853, and was elected an honorary member of the Royal Academy of London in 1869. He died in Paris, January 20, 1892.

HENRIQUEZ, ĕn-rē′kȧth, FRANCISCO FERNANDEZ DE LA CUEVA. See FERNANDEZ DE LA CUEVA, HENRIQUEZ FRANCISCO.

HENRY (named in honor of Joseph *Henry*). The practical unit of induction in the measurement of self and mutual induction. (See ELECTRICITY and ELECTRICAL UNITS.) It is the induction in a circuit if the induced electro-motive force in it is one volt when produced by the variation of a current at the rate of one ampere per second. The henry is, therefore, substantially 10^9 times the C. G. S. electromagnetic unit of induction.

HENRY I. (876-936). King of the Germans from 919 to 936, surnamed the Fowler. He was the son of Otho, Duke of Saxony, and was distinguished in early youth for the courage and energy with which he warred against the Slav tribes to the east of his native duchy. Otho, who died in 912, appointed Henry his successor, not only as Duke of Saxony, but as Lord of Thuringia and part of Franconia. The German King Conrad I., instigated by certain ecclesiastical advisers whom Henry's independent bearing toward the Church had deeply offended, resisted the claims of the young Duke; but the latter was ultimately left in possession of all the lands over which his father had ruled. After Conrad's death, Henry, to whom Conrad had sent the royal insignia, was chosen King by the Franconian and Saxon nobles (919), and he had little difficulty in securing the acquiescence of the rest of Germany. For some years Lotharingia or Lorraine had held an uncertain position between the kingdoms of the East and the West Franks, as Germany and France were then called; but in 925 Duke Giselbert transferred his allegiance from the French to the German King. From the time of Louis the Child, Germany had been exposed to the inroads of the Hungarians. In 924 Henry had to purchase a truce of nine years by agreeing to pay an annual tribute to the Hungarians. The King made use of this respite by preparing his subjects for a final struggle with the barbarous invaders. In the northern districts the Germans had hitherto lived for the most part in small villages or on separate settlements. Henry began building fortified cities throughout Saxony and Thuringia, and in the remaining duchies his example was followed. He also trained his vassals to meet the enemy on horseback, thus giving a strong impetus to the movement which resulted in the institution of chivalry. When his arrangements were complete he tried his new force in a contest

with the Danes and with some Slav tribes, whom he utterly defeated. In 933 the Hungarians demanded as usual the tribute which had till then been punctually paid, and when it was refused invaded Thuringia with a great army. Henry defeated them so decisively that they did not again enter Germany for some years, and were never again seen in the northern duchies. In 934 Henry fought against the Danes and compelled their King to pay tribute. In the internal affairs of the realm he acted with great precaution and judgment. The dukes by this time had become so powerful that there was some danger of their altogether overshadowing the throne. Instead of directly forcing them to submission, as was afterwards done by his son Otho, he attached them to his interests by confirming them in many of their rights, and by acting as a mediator in their disputes. Toward the close of his life his position was so secure that he resolved to go to Rome either on a pilgrimage or to claim the Imperial crown; but he died of apoplexy, July 2, 936. Consult Waitz, *Jahrbücher des deutschen Reichs unter Heinrich I.* (3d ed., Leipzig, 1885).

HENRY II. (c.973-1024). Holy Roman Emperor from 1002 to 1024. He was the son of Henry the Quarrelsome, Duke of Bavaria, and a great-grandson of Henry I. (q.v.). He was in Italy with Otho III. in 1001, and upon the latter's death, in January, 1002, hastened to secure possession of the Imperial power, with the aid of the Archbishop of Mainz. He was crowned at Mainz, June 3, 1002. His most determined enemy during the greater part of his reign was Boleslas Chrobry (the Brave) of Poland, who annexed Bohemia, and during the King's absence in Italy, in 1004, invaded Lusatia and Meissen. Henry hurried back, defeated Boleslas in 1005, and granted Bohemia as a fief to Jaromir, of the native House of the Premyslides. Boleslas, however, continued the war, which was not ended until 1018, when Henry was obliged to conclude peace on terms favorable to the Polish King. In the midst of this struggle he had to make war on Adalboro, his wife's brother, who had seized the Archbishopric of Treves, and was protected in his claim by another brother of the Empress, the Duke of Bavaria. Both were overcome and deprived of their dignities, although Bavaria was ultimately restored to the elder of the two brothers. Henry also put down rebellions in Flanders and Meissen, and concluded, in 1007, a treaty with Rudolph III. of Burgundy, whereby, after Rudolph's death, his territories were to be united to Germany. In 1013 Henry went for the second time to Italy, where Arduin had raised himself to the throne. The usurper was displaced, and in 1014 Henry was crowned Emperor at Rome by Benedict VIII., whom he had confirmed in the Papal See in opposition to the Antipope Gregory. At the request of Benedict the Emperor returned to Italy in 1022, in order to drive back the Greeks, who were steadily pressing northward. Henry died July 13, 1024, and was canonized by Pope Eugenius III. in 1146. His wife, Kunigunde, was also ranked among the saints. Henry founded the Bishopric of Bamberg, which was given very great privileges, and which the Pope took under his immediate protection. Consult Hirsch and Bresslau, *Jahrbücher des deutschen Reichs unter Heinrich II.* (Leipzig, 1862-75).

HENRY III. (1017-56). Holy Roman Emperor from 1039 to 1056. He belonged to the Franconian or Salic line, and was the son of Conrad II. He was crowned Duke of Bavaria in 1027, King of the Germans as successor presumptive to his father, 1028, Duke of Swabia and King of Burgundy in 1038, and became King of Germany at his father's death, in 1039. Henry possessed great natural abilities, had been educated with the utmost care, and succeeded to an exceptionally strong dominion. The four duchies of Franconia, Swabia, Bavaria, and Carinthia were at first in his own hands, and two only, Saxony and Lorraine, had semi-independent dukes. Under him the German Empire attained to very great power. Poland was a subject principality, the Bohemian Duke was compelled to become Henry's vassal in 1041, and for a time the King of Hungary acknowledged his overlordship. In Italy Drogo, the Norman, became his vassal for Apulia. In 1046 Henry made his first expedition to Italy, summoned to end the troubles caused by the three rival popes, Benedict IX., Gregory VI., and Sylvester III. All three were deposed. Henry was asked to appoint a new Pope, and during the remainder of his reign the occupants of the Papal chair were nominated by him. He was crowned Emperor at Christmas, 1046. From this time on, however, Henry was compelled constantly to face revolts in different parts of his dominions. The revolt of Godfrey in Lorraine proved exceedingly formidable, but Henry ultimately triumphed. He died on October 5, 1056. Henry was deeply devoted to the Church, and earnestly endeavored to reform the clergy. He aided the Papacy in securing the power which was to be so dangerous to his son; but during his life the popes and the Emperor worked in harmony to check the abuses in the Church. Consult: Steindorff, *Jahrbücher des deutschen Reichs unter Heinrich III.* (Leipzig, 1874-81); Giesebrecht, *Geschichte der deutschen Kaiserzeit*, vol. ii. (5th ed., Leipzig, 1885).

HENRY IV. (1050-1106). Holy Roman Emperor from 1056 to 1106. He was the son of Henry III., and was born November 11, 1050. He had been crowned in 1054, and although only six years old at his father's death, was recognized at once as King of Germany, Italy, and Burgundy, his mother, Agnes of Poitou, ruling in his name. Henry III. had exercised great power over the Church and had greatly strengthened the Papacy; in Germany he had held the nobles in subjugation against their will. Now both the Church and the nobles seized the opportunity to achieve their independence. The brother of Godfrey of Lorraine (see HENRY III.) was elected Pope as Stephen IX., and Godfrey was made Imperial vicar in Italy. Agnes was not strong enough to rule effectively. She was forced to cede Lorraine to Godfrey, and to bestow upon the most powerful of the nobles the three great southern duchies of Swabia, Bavaria, and Carinthia, thus undoing the work of Conrad II. (q.v.). Her authority was not recognized in Italy. Even the bishops in Germany, who had been the chief instruments of her husband, deserted her. In 1062 Anno, Archbishop of Cologne, seized Henry by treachery and governed in his

name. Under Anno's regency the German authority was reëstablished over Hungary. The Archbishop, however, was greatly disliked by Henry, and was forced to make way for the Archbishop Adalbert of Bremen, who became the young King's tutor, and in 1065 caused him to be declared of age. Henry had been brought up very badly. He had ability, but an ungovernable temper; he was brave, but a poor general; he was surrounded by flatterers, and at first gave himself up almost entirely to pleasure. Germany soon sank into a state of feudal anarchy. The Slavs revolted and devastated the northeastern parts of the Empire, while the Danes held the Baltic coast. Henry attempted to reëstablish his authority by degrading the independent dukes in the south, by imprisoning the Duke of Saxony, and by erecting many fortresses in his duchy. The Saxons revolted in 1073, instigated in large measure by their bishops, and Henry barely escaped from their hands. The nobles in the north aided him against Saxony, and in June, 1075, he won a great victory on the Unstrut which temporarily crushed the rebellion; for the first time he seemed to be really powerful.

But the greatest danger came to a head just at this time. After the death of Henry III. the Papacy had gradually freed itself from Imperial control. In 1059 a decree had been enacted which gave the election of the Pope to the college of cardinals, and during the period of disorder in Germany the Church, under the guidance of Hildebrand, had gained steadily in power. In 1073 Hildebrand was elected Pope as Gregory VII. (q.v.), and proceeded with greater energy to carry out the policy of ecclesiastical and Papal supremacy with which he had been identified so closely under the two preceding popes. In 1075 a synod at Rome passed a decree against lay investiture, threatening secular princes who should presume to confer abbacies or bishoprics on priests with excommunication. The bishops and abbots in the Empire held great possessions and were great territorial lords. If Henry could not control their appointment, a large part of his resources and power would be taken from him and a large section of the Empire would become independent. As long as the bishops and abbots continued to hold their temporal possessions as feudal lords, it was absolutely necessary to the King to have them under his control. On the other hand, the Church was determined to appoint its own officials. When Henry therefore appointed an archbishop for Milan, Gregory sent legates to demand that he should obey the decree against lay investiture, charging him at the same time with simony and oppression of the clergy. Henry, however, was elated by his great victory over the Saxons, and in no mood to temporize, as he had done previously. He retorted by convoking a German council at Worms, January 24, 1076, which deposed the Pope. The Pope in return excommunicated Henry, decreed his deposition, and released his subjects from their oath of allegiance. All of Henry's enemies seized this opportunity to revolt, and proposed to elect a new king, and the most that Henry could obtain was a respite. He was deprived of all authority, and if not absolved within a year was to be deposed.

The Pope seemed to be entirely triumphant, and Henry doomed to degradation; but there was one weak point in Gregory's position which afforded Henry a chance of redeeming his fortunes. As a Christian priest the Pope was bound to pardon a penitent who sought absolution; when, therefore, Gregory, who had promised to take no action without the consent of the German nobles, with whom he was to hold a council, set out for Germany, Henry hurried to Italy to meet him. The Lombards, who were hostile to the Pope, welcomed the Emperor eagerly, and he soon had an army at his command. Gregory took refuge in the strong castle of Canossa, belonging to Countess Matilda of Tuscany. Henry, however, had not come to fight, but to seek absolution. For three days (January 25-27, 1077) he begged admission to Canossa as a penitent, waiting barefooted at the gate of the courtyard of the castle; and finally Gregory had to yield and to grant the desired absolution. Canossa was the deepest possible humiliation for Henry, but his act had won for him a diplomatic victory. He had prevented the meeting between Gregory and the nobles, and had placed the latter in the position of rebels, if they persisted in their hostility.

Many of them did persist, and elected an anti-king in the person of Rudolph, Duke of Swabia; but Henry now had many partisans. Civil war raged throughout Germany, and every part of the country except Saxony was divided into two parties. Gregory VII. hesitated, but finally in 1080 recognized the anti-king, and excommunicated Henry once more. Rudolph, however, was killed soon after, and his death was accepted as a judgment of God. An antipope, Clement III., was elected by the Imperial Party, and in 1084 Henry captured the city of Rome and installed the antipope, who gave him the Imperial crown; but in the same year the Emperor, who had been besieging Gregory VII. in Sant' Angelo, was driven from Rome by Robert Guiscard (q.v.). Gregory VII. died soon after in exile. The strife went on in Germany, where Henry had to contend against two other anti-kings—Hermann of Luxemburg, who died in 1087, and the Margrave of Meissen, whose death occurred in 1089. Supported by Godfrey of Bouillon (q.v.) and Frederick of Swabia, the ancestor of the Hohenstaufen, Henry was on the whole successfully asserting himself, when his eldest son, Conrad, joined the Emperor's enemies. For a time this weakened the Emperor, but he gradually won the support of the great nobles, all of whom were weary of the strife. Conrad was deposed from his position as heir to the throne, and died in 1101, and Henry, the second son of the Emperor, was declared heir. Henry's difficulties, however, were not over. The Pope, Paschal II., renewed the excommunication against Henry. His second son was induced to rebel, and the Emperor was made prisoner December, 1105, and forced to abdicate. He died soon after, August 7, 1106, while preparing to make war upon his son. As he died excommunicated, his body remained unburied for five years. During the latter part of his life especially, he was very popular with the people, who mourned his loss. Consult: Meyer von Knonau, *Jahrbücher des deutschen Reichs unter Heinrich IV. und Heinrich V.* (Leipzig, 1890-94); Floto, *Heinrich IV. und sein Zeitalter* (Stuttgart, 1855-57); Giesebrecht, *Geschichte der deutschen Kaiserzeit*, vol. iii. (5th ed., Leipzig, 1890); also the authorities referred to under GREGORY VII. See INVESTITURE.

HENRY V. (1081-1125). Holy Roman Emperor from 1106 to 1125. He was the second son of Henry IV., and was appointed his father's successor in 1098 after his elder brother, Conrad, had forfeited his right to the throne by rebellion. Six years afterwards he himself rebelled against the Emperor. The Papal party, with which he allied himself, took for granted that when he mounted the throne Church and State would instantly be reconciled; but their hopes were disappointed. The main point for which Henry IV. had contended was the right of investing the bishops with ring and staff. When Henry V. succeeded him in 1106, Pope Paschal II. demanded that this right should be given up, but Henry replied that he could not resign powers that had been exercised by his predecessors, and the loss of which would imply that the ecclesiastical lands of Germany would be removed from secular control. In 1110 he entered Italy at the head of 30,000 men. Paschal proposed that the Church should give up its property and feudal privileges if Henry would renounce the right of investiture. To this the latter agreed, and a day was appointed for the coronation of Henry as Emperor. The opposition of the Roman prelates made it impossible for the Pope to proceed with the ceremony, whereupon he and his cardinals were made prisoners. Paschal then formally recognized the right of investiture, and Henry received the Imperial crown. When the Germans had recrossed the Alps, Paschal renounced the treaty he had concluded, and the Emperor was excommunicated. As many of the princes were pleased to avail themselves of this opportunity for rebelling, Germany again became the scene of confused contests like those which had plunged the country into misery during Henry IV.'s long reign. In 1116 the Emperor went a second time to Italy and drove Paschal from Rome, and after Paschal's death he caused Gregory VIII. to be elected Pope. The Papal party, however, selected Gelasius II., who renewed the sentence of excommunication against Henry. The latter returned to Germany in 1119, and at the Diet of Tribur succeeded in allaying the hostility of the more important among his enemies. Pope Calixtus II., who succeeded Gelasius in 1119, now found it necessary to offer a compromise; and the controversy between the Empire and the Papacy was for the time closed by the Concordat of Worms (1122), in which it was agreed that at every election of a prelate in Germany the Emperor should have the right of being present in person or through a representative, and that the chosen bishop or abbot, before being consecrated, should receive his lands and secular authority in fief of the Crown. In the other parts of the Empire the election was to be free and canonical, and the Emperor to confer the secular authority after the consecration. Henry died at Nimeguen, May 23, 1125. Consult: Giesebrecht, *Geschichte der deutschen Kaiserzeit*, vol. iii. (5th ed., Leipzig, 1890). See INVESTITURE.

HENRY VI. (1165-97). Holy Roman Emperor from 1190 to 1197. He was the son of Frederick Barbarossa, and was crowned King in 1169. He assumed control of the government on his father's departure for the Holy Land in 1189, and on the latter's death, in the following year, succeeded to the throne. He shared the intellectual culture of his time, and was distinguished for the splendor of his political schemes; but he was of a stern disposition, and in order to attain his ends was guilty of cruelty. Henry the Lion (q.v.), who had been banished to England by Frederick I., had returned to Germany in 1189, and again disturbed the country with his wars. King Henry, after restoring peace, hastened to Rome, where he was crowned Emperor in 1191. Through his wife, Constance, he had a claim to the throne of Sicily; but the Sicilian nobles made Count Tancred, an illegitimate son of Constance's brother, King. After receiving the Imperial crown, Henry advanced against Tancred. He was successful in Sicily, but before Naples his army was struck by pestilence, and he was forced to return to Germany. There he suppressed various private wars, and compelled Henry the Lion to acknowledge his supremacy. The great ransom which he received from Richard I. (q.v.) of England enabled him to fit out a large army, and with this he descended upon Italy in 1194, and without much difficulty conquered the Sicilian kingdom. Tancred was dead, but he had left a number of relatives, who were so barbarously treated that the people were seized with terror. On his return to Germany it was easy for Henry, with the prestige which he had now acquired, to enforce submission; and so great was his authority that, in 1196, he endeavored to secure the declaration that the crown be made hereditary in his family. Had he lived some years longer he would probably have succeeded, but he died suddenly at Messina, September 28, 1197. His power was greater than that wielded by any other German Emperor. Aside from his firm control over the Imperial lands, Sicily had been subdued, and Richard of England, the King of Cyprus, and Bohemond of Antioch had become his vassals. Consult Toeche, *Jahrbücher des deutschen Reichs unter Heinrich VI.* (Leipzig, 1867).

HENRY VII. (?-1313). Holy Roman Emperor from 1308 to 1313, the first of the line of Luxemburg. He was the son of Duke Henry III. of Luxemburg, and succeeded Albert I. as German King in 1308, being crowned at Aix-la-Chapelle in the following year. When he came to the throne Bohemia was subject to Henry of Carinthia, who was greatly disliked by his subjects. The King displaced him in 1310, and enriched his own family by granting Bohemia, at the request of the Bohemians themselves, to his son John, whose claims were rendered secure by his marriage with Elizabeth, the daughter of Wenceslas II. For some time no German King had sought the Imperial crown; but Henry resolved to revive the traditions which were dying out, and with a view to this result did what he could to compose the differences between the nobles and to gain their allegiance. He was welcomed in Italy with eagerness by the Ghibellines, whose great poet, Dante, saw in Henry VII. the savior that was to rescue Italy from anarchy and to bring it peace and honor. The *De Monarchia* of Dante was probably written at this time. In 1312 Henry was crowned Emperor of Rome, having previously received the iron crown of Lombardy in Milan. He was preparing to undertake an expedition for the conquest of Naples, when he died suddenly, near Siena, August 24, 1313. It was generally believed at the time that he had been poisoned by a Dominican monk, but this was not proved. Consult: Dönniges, *Acta Henrici VII.* (Berlin,

1840-41); Barthold, *Der Römerzug König Heinrichs von Lützelburg* (Königsberg, 1830-31); Pöhlmann, *Der Römerzug Kaiser Heinrichs VII.* (Nuremberg, 1875).

HENRY I. (1068-1135). King of England from 1100 to 1135. He was the fourth son of William the Conqueror, and was born, according to tradition, at Selby, in Yorkshire. Unlike his elder brothers, Robert and William Rufus, he was of a studious disposition, and received what was for the times an excellent education, being known later in history as Beauclerc. At his father's death he received £5000, but no lands. With £3000 he bought from his brother Robert, Duke of Normandy, the Avranchin and the Cotentin, and displayed great ability in the government of his territories. In 1091 William Rufus and Robert wrested his possessions from him, after besieging him for a long time in Mont Saint-Michel. For a time he wandered about, a landless man, until the men of the town of Domfront, on the river Varenne, invited him to become their lord. Henry thus obtained possession of a powerful stronghold, which he used as a base of operations in numerous raids against his brother, the Duke of Normandy, and Robert of Bellême. After 1094 he and William were allies, and in 1096 he received from the latter the counties of Coutances and Bayeux. When William Rufus was found dead in the New Forest, where the two brothers had been hunting, August 2, 1100, Henry at once rode to Winchester and seized the royal treasury, and two days later was crowned at Westminster, publishing a charter of rights which was subsequently taken as the basis of Magna Charta. To strengthen his hold on the crown, he recalled Anselm, the exiled Archbishop of Canterbury, thus gaining the support of the clergy, and by his marriage to Eadgyth, or Matilda, daughter of Malcolm Canmore, King of Scotland, and great-granddaughter of Edmund Ironside, he won the affections of his Saxon subjects. Henry successfully defended the throne against his brother Robert. In July, 1101, the Norman Duke invaded England, and Henry was forced by a conspiracy among his nobles to come to terms with his brother, ceding to Robert all his possessions in Normandy excepting Domfront, and granting him a pension. War with Robert broke out again in 1105, and on September 28, 1106, Henry defeated the Duke in a bloody battle before the walls of Tinchebray, and took him prisoner. Robert was confined in Cardiff Castle till his death, in 1134. The acquisition of Normandy added greatly to Henry's strength; but he had some trouble in keeping the duchy, as the French King, Louis VI., and the Count of Anjou took part with William, Robert's youthful son. A desultory warfare was carried on from 1109 to 1120, during which a large part of Normandy was devastated and great atrocities were committed on both sides. The death in 1120 of his son William, whom the King greatly loved, was a severe blow to Henry. To prevent the crown from falling into the possession of his nephew William, he caused his barons in 1126 to accept as his successor in England and Normandy his daughter Matilda, who in 1128 became the wife of Geoffrey Plantagenet, Count of Anjou. Henry died on December 1, 1135, near Rouen.

The reign of Henry I. was important for the progress that was made toward the amalgamation of the Saxons and the Normans in England. The feeling of English nationality was greatly stimulated by the wars carried on against the French and the rebellious nobles in Normandy. The King continued the policy of the Conqueror in relentlessly crushing down the opposition of the great nobles, and in making himself the champion of the common people against their territorial lords. In carrying out this policy the functions of the *curia regis*, or King's Court, were greatly increased, and for the first time justices as guardians of the King's peace were sent through the country. The great offices of State were conferred by preference on the members of the clergy. Yet in his struggle with Anselm and other prelates over the rights of nomination and consecration of bishops, the King knew how to keep the virtual power in his own hands without arousing the open hostility of the Church. Henry had great natural ability, especially in the line of State intrigue. He was, however, dissolute, cruel, avaricious, and given to acts of meanness. His influence on English history, nevertheless, was lasting. Consult: Freeman, *The Norman Conquest*, vols. iv. and v. (Oxford, 1867-79); id., *William Rufus* (Oxford, 1882); Norgate, *England Under the Angevin Kings* (London, 1887); Stubbs, *Constitutional History of England*, vol. i. (Oxford, 1891).

HENRY II. (1133-89). King of England from 1154 to 1189. He was the grandson of Henry I. by his daughter Matilda and her second husband, Geoffrey Plantagenet, and was born March 5, 1133, at Le Mans, in Maine. From his birth he was regarded as the successor of Henry I.; but on the death of the latter, in 1135, the English crown was seized by Stephen of Blois, and a civil war followed, in which the country was devastated and reduced to anarchy. During his minority Henry's affairs were under the care of his mother, Matilda, and her half-brother, Robert, Earl of Gloucester. In 1151 Henry received Normandy from the French King; the death of his father soon after left him master of Anjou, Maine, and Touraine; and by his marriage, in May, 1152, to Eleanor, the divorced wife of Louis VII. of France, he added to his possessions the immense territories of Guienne (Aquitaine) and Poitou, so that he was the ruler of more extensive domains in France than the French King himself. In 1153 Henry made an attempt to conquer England. After nine months of fighting it was agreed, by the Treaty of Wallingford, November, 1153, that Stephen should reign during his lifetime, and that Henry should succeed him. Stephen's death occurred the following year, and Henry was crowned December 19, 1154, together with his Queen, Eleanor. The early years of his reign were devoted to the restoration of peace, and the reduction of the powerful nobles who had taken advantage of the civil war to make themselves virtually independent of the royal authority. The judicial and financial systems were reorganized, and the Crown was freed in great measure from its dependence on the great feudatories by the institution of 'scutage' or shield money as a substitute for personal military service, due from the vassal, thus enabling the King to maintain a standing force subject to his will alone. The chief obstacle in the way of Henry's schemes for the aggrandizement of the royal power was the

clergy, whose immunity from the jurisdiction of the secular courts made them a disturbing factor in the judicial administration of the country. To aid him in reducing the Church to submission to the civil power, Henry appointed his trusted Chancellor, Thomas à Becket (q.v.) to the See of Canterbury, in June, 1162. Becket, however, to the surprise and indignation of the King, became the most fervent champion of ecclesiastical privilege and repeatedly thwarted the royal measures aimed against the Church. Henry succeeded, nevertheless, in wringing from the bishops a ratification of the ancient customs of the land as reenacted in the Constitutions of Clarendon in 1164. (See CLARENDON, CONSTITUTIONS OF.) The long struggle with Becket was terminated only by the latter's murder, in 1170. Henry did penance at his grave, allowing himself to be scourged by the monks; but though the Constitutions of Clarendon were formally repealed, the King was ultimately successful in reducing the Church to subordination in civil matters. The administration of justice in the criminal courts was regulated in 1166 by the Assize of Clarendon. See CLARENDON, ASSIZE OF.

During Henry's reign occurred the conquest of Ireland. That country was then the home of a number of tribes or clans, and Pope Adrian IV. in 1155, by a bull, is said to have given Henry the authority over the entire island, and ordered the inhabitants to obey him. In 1166 the intervention of the English was solicited by one of the Irish petty kings, Diarmait of Leinster (see MACMURROUGH), and Henry gave leave to any of his subjects to aid him. Robert Fitzstephens, Constable of Albertivi, Maurice Fitzgerald, and Richard de Clare, surnamed Strongbow, Earl of Strigul, went over with a few hundred men-at-arms, and in four years conquered the coast region from the Nore to the Liffey. Their success was so rapid that Henry became jealous, and in 1171 went over himself with an army of four thousand men to complete the conquest of the country. All Ireland except Connaught submitted for the time, but the majority of Irish tribes and chieftains continued to be independent for centuries. During this reign, also, the first ascendency of England over Scotland was gained. Henry's sons, incited by their mother, rebelled against him (1173), and their cause was espoused by the Kings of France and Scotland. The latter, William the Lion, was ravaging the north of England with an army, when he was surprised at Alnwick and taken prisoner, July 13, 1174. To obtain his liberty, he stipulated to do homage to Henry for Scotland, and to cede to him five of his strongest fortresses. In Normandy, Anjou, and Aquitaine, Henry was equally successful in suppressing the rebellion. In the course of a second rebellion of his sons (1183) Henry, the eldest son, died; Geoffrey, the second son, died three years later. Richard Cœur-de-Lion still remained hostile to his father, and with the aid of King Philip Augustus of France drove Henry from Maine and Anjou. Deserted by all his troops, Henry was compelled to come to terms with Richard. On July 4, 1189, peace was concluded at Colombières. One of the stipulations was for an indemnity for all the followers of Richard. The sight of the name of his favorite son John in the list, acting upon a constitution weakened by many cares, threw the King into a fever, of which he died, July 6, 1189, at Chinon.

Henry was a man of restless energy, subject to sudden outbursts of a mad temper, but a born ruler, nevertheless, who gave to his subjects justice and peace. During his reign the barons were overawed, and hundreds of their castles were destroyed. Law made very great progress; circuit courts were established, and Henry facilitated the making of appeals to his own courts, in order to bring the people into direct dependence upon the King. The earliest writer on English law, Ranulf de Glanville, was Henry's chief judiciary. In intellect and character he resembled his grandfather, Henry I. He had three illegitimate children; his mistress, the Fair Rosamond (q.v.), may have been the mother of the first of the two that are remembered: William Longsword, Earl of Salisbury, and Geoffrey, who became Archbishop of York, and who was faithful to him when his four legitimate sons took up arms against him. Henry was a great builder of palaces and roads; of the latter, the great embankment, 30 miles in length, erected to prevent floods from the river Loire, still remains in use. He was a lover of learning and an assiduous reader. His great work for England consisted in uniting the conquerors and conquered into one race, and in laying the foundation for the present Greater Britain by the conquest of Ireland. Consult: Norgate, *England Under the Angevin Kings* (London, 1887); Stubbs, *Constitutional History of England* (Oxford, 1891); id., *The Early Plantagenets* (London, 1876); Green, *History of the English People* (London, 1874); Mrs. J. R. Green, *Henry the Second* (London, 1888).

HENRY III. (1207-72). King of England from 1216 to 1272. He was the eldest son of King John and of Isabella of Angoulême, and was born at Winchester, October 1, 1207. He succeeded his father in 1216, under the regency of William Marshall, Earl of Pembroke. The French Dauphin, who had invaded England during the lifetime of King John, in response to an invitation by a party among the nobles, was defeated in 1217, and the confirmation of Magna Charta in the same year established Henry securely on the throne. The Regent died in 1219, and the chief powers of government were exercised by Stephen Langton, Archbishop of Canterbury, and the Justiciar Hubert de Burgh. The dismissal of Hubert in 1232 was followed by the rule of foreign favorites, which stirred up great dissatisfaction in the nation. Henry was constantly beset with hosts of his Poitevin relations and men from the country of his Queen, Eleanor of Provence, whom he married on January 14, 1236. His weakness was shown also in his failure to make a stand against the ecclesiastical demands of the clergy and the Pope. Schemes for foreign conquest loaded the nation with a heavy debt and increased the general discontent. In 1258 the barons in Parliament, headed by his brother-in-law, Simon de Montfort, Earl of Leicester, rose against him, and forced him to transfer his power temporarily to a commission of barons and to enact a number of reforms. He agreed to these demands by the Provisions of Oxford (q.v.). The barons, however, failed to make any use of that power in reforming the State, and the King utilized the opportunity to regain the power which he alleged, with truth, had been taken from him by compulsion, though his action had worn the appear-

ance of free will. The question of the validity of these provisions was submitted by both parties to Saint Louis of France, who in the Mise of Amiens (q.v.) annulled the provisions (1264). Leicester and his party refused to be bound by the decision, and took up arms against the King. They defeated him and took him prisoner in the battle of Lewes, on May 14, 1264. The battle was followed by an agreement known as the 'Mise of Lewes' (q.v.), more humiliating to the King than the Provisions of Oxford. Leicester, being virtual ruler of the country, summoned a Parliament in 1265, to which, for the first time in English history, representatives from both boroughs and shires were called. Knights of the shire had been summoned to Parliament as early as 1254. Leicester's supremacy did not last long. Within a year the powerful Earl of Gloucester deserted his party, and with Prince Edward, the gifted son of the King, who had been taken prisoner at Lewes and succeeded in making his escape, led an overwhelming army against Leicester, who was defeated and slain at Evesham, on August 4, 1265. During the remainder of Henry's reign affairs were under the control of Prince Edward. The King died on November 16, 1272, and was succeeded by his son. The weakness of Henry and his father had allowed the development of the power of the barons, and in the struggle between the two the modern system of Parliamentary Government arose, marked by the concession of representation to the shires and the boroughs. Statute law dates from the time of Henry III., the Provisions of Merton, passed in the twentieth year of Henry's reign, being the first enactment on the English statute book. Consult: Stubbs, *Constitutional History of England* (Oxford, 1891); Prothero, *Simon de Montfort* (London, 1877); Pauli, *Simon de Montfort* (Tübingen, 1867); Green, *History of the English People* (London, 1874).

HENRY IV. (1367-1413). King of England from 1399 to 1413. He was the eldest son of John of Gaunt, fourth son of Edward III., and Blanche, the daughter of Henry, Duke of Lancaster, and was born April 3, 1367, at his father's castle of Bolingbroke in Lincolnshire. He is frequently called Henry of Bolingbroke from the name of his birthplace, but to his contemporaries he was more generally known as Henry of Lancaster. About 1380 he married Mary Bohun, one of the heiresses of the Earl of Hereford. He was distinguished for his martial attainments, and became a great favorite with the people of London. From 1387 to 1390 he was one of the leaders of the party opposed to Richard II. (q.v.), being one of the five lords appellants who in 1387 led an army against London and forced Richard to dismiss his unpopular favorites. In 1390-91 he was engaged on a crusading expedition in Lithuania with the Teutonic Knights. In 1392 he started on a second expedition to Lithuania, but soon changed his purpose and made a pilgrimage to Jerusalem. After his return he joined the King's Party, and was made Duke of Hereford in 1397. In 1398, as a result of the hostility between Henry and the Duke of Norfolk, the former was banished from England for six years, while his rival was exiled for life. Henry's banishment served to increase his popularity with the people of London, who chose to regard him as a martyr. In 1399 his father died, and Richard, in spite of his promise, confiscated the estates which should have descended to Henry. The latter, profiting by the King's absence in Ireland, landed in England in July, 1399. He was eagerly welcomed by all the discontented, and met with no effectual opposition. Richard on his return from Ireland was deserted by his followers, and soon fell into Henry's hands. The King agreed to abdicate, his resignation was accepted by Parliament on September 30, 1399, and Henry was chosen King, inaugurating the line of Lancaster. As he was not the nearest heir in line of descent, and as he did not claim England by right of conquest, he owed his title to Parliament, and he is sometimes called the first constitutional monarch. The first half of his reign was filled with wars. At his accession he showed himself lenient to all his former enemies, merely taking from them the dignities which they had won at his expense. An attempt at rebellion in January, 1400, by the lords whom he had degraded was easily put down. Most of the rebels were put to death, and Richard II. died soon after, possibly murdered. In the same year the Welsh revolted under Owen Glendower (q.v.). The Scots, who also began war, were defeated at Homildon Hill (q.v.) in 1402. The French gave aid both to the Scotch and Welsh and harried the English coast, but accomplished little, on account of their internal dissensions. In 1403 the Percy family, dissatisfied with the rewards bestowed upon them by the new King, rose in rebellion, but were overthrown in the battle of Shrewsbury, in which Harry Percy, the famous Hotspur, fell. In 1405 James I., heir to the Scotch throne, was captured while on his way to France, and this brought peace with Scotland. After this date the wars were less dangerous, but Henry suffered from an illness which gradually sapped his strength. Another rebellion was put down in 1408, and at the same time a number of successes were gained over the Welsh. Henry died March 20, 1413. He was brave, naturally merciful, devout, and able, but subject to fits of passion. He recognized the authority of Parliament and acted as a constitutional monarch. His reign was stained by enactments against the Lollards, and by persecutions. He was a patron of Gower, Chaucer, and Christine de Pisan. He had four sons and two daughters by his first wife. In 1403 he married Joan of Brittany as a matter of diplomacy, but he gained nothing by this marriage. For the best modern authorities on his reign, consult: Stubbs, *Constitutional History of England* (Oxford, 1891); Pauli, *Geschichte von England* (Leipzig, 1864-75); Wylie, *History of Henry IV.* (4 vols., London, 1884-98).

HENRY V. (1387-1422). King of England from 1413 to 1422. He was the eldest son of Henry IV. and of Mary Bohun, and was born August 9, 1387, at Monmouth. In 1399, on the accession of his father to the throne, he became Earl of Chester, Duke of Cornwall, Prince of Wales, Duke of Aquitaine, and Duke of Lancaster. In his youth he had acquired great military distinction in operations against Hotspur and Glendower (q.v.), and in 1410 and 1411 he governed in the name of his father, who was ill. In 1412 he fell into disfavor with his father, and was deprived of his power. At his father's death, March 20, 1413, he became King. He liberated the young Earl of March from the confinement in which Henry IV. had placed him,

and restored the son of Hotspur to the lands and honors which his father had lost by rebellion. He followed in the footsteps of his father in persecuting the Lollards with fire and halter, the celebrated leader of the Lollards, Sir John Oldcastle (q.v.), being put to death in 1417. The great event of his reign was the attempted conquest of France, in which he virtually succeeded. In his first campaign he besieged and took the town of Harfleur, and gained the battle of Agincourt (q.v.), October 25, 1415, against enormous odds. Two years after he again invaded France, and made Normandy once more subject to the English Crown. Rouen was captured in January, 1419, after a long siege, an incapable King and civil discord in France aiding him greatly. On May 21, 1420, a treaty was concluded at Troyes between Henry and the French King, Charles VI., by which Henry obtained the regency of France, the eldest daughter of the French King for his wife, and the succession to the French crown on the death of the King. He was married to Catharine of France on June 2, 1420. He had hardly returned to England when the defeat at Beaugé of his brother, the Duke of Clarence, whom he had left as Governor of Normandy, rekindled the hopes of the French, who supported the Dauphin Charles in his repudiation of the Treaty of Troyes, to which he had not agreed. Henry returned to France for a third campaign, and his wonted success in arms was following him when he was seized with illness, and died on August 31, 1422, at Vincennes, at the age of thirty-five years, leaving an infant son, Henry VI., to succeed him. His private life was exemplary; as a King he was noted for his strict justice; in war he was one of the ablest generals of his time. Consult: Pauli, *Geschichte von England* (Leipzig, 1864-75); Stubbs, *Constitutional History of England* (Oxford, 1891); Wylie, *History of Henry IV.* (London, 1884-98); Church, *Henry V.* (London and New York, 1889).

HENRY VI. (1421-71). King of England from 1422 to 1461. He was the only child of Henry V. and Catharine of France, and was born at Windsor, December 6, 1421. He was not quite nine months old at his father's death, when he became King of England, and a few weeks later, on the death of Charles VI. of France, he was also proclaimed King of that country. His claim to France was disputed by Charles VII.; but the latter was too indolent to make any serious attempt to conquer the kingdom. The Duke of Bedford, brother of Henry V., who was Regent of France, was successful in holding the country for Henry VI. until 1429. Then Joan of Arc (q.v.), by her heroism, aroused the valor of the French nation, defeated the English at Orléans, and led Charles VII. to Rheims to be crowned. The Maid of Orléans fell into the hands of the English the following year and was burned in 1431, and a few months later Bedford was able to have Henry crowned at Paris. He had already received the English Crown at Westminster, on November 6, 1429. But France gradually passed out of the control of the English, as the French united against foreign rule. On Bedford's death, in 1435, the Duke of Burgundy broke off his alliance with the English and joined Charles VII. From this time the English lost ground steadily, and by the end of 1451 Calais was the only English possession in France. During Henry's minority there was no opposition to the King in England; but his marriage with Margaret of Anjou, in 1445, was unpopular, as the bride brought no dowry and one of the conditions of the marriage was the surrender of some English territory in France. Henry's own weakness, the lack of success in France, and economic troubles at home aroused bitter opposition, for Henry was virtuous and amiable, but unequal to the task of ruling. When he was thirty-two years old his weak intellect gave way, and he became insane. At times he recovered his reason, but was always subject to a relapse into insanity.

As the wars ceased in France, disorderly bands of soldiers returned home and sought service with the powerful nobles, who maintained great armies of followers, in defiance of the law. The King was too weak to enforce order in his kingdom, and many illegal usurpations of property by the great nobles went unpunished. The system of inclosing lands for pasturage threw many agricultural laborers out of employment. The result was a rising on the part of the people. In 1450 the Duke of Suffolk, who had negotiated the marriage with Margaret, and was the King's favorite Minister, was impeached by the Commons and condemned to banishment, but was murdered on his way to the Continent. Not content with the fall of Suffolk, the men of Kent, led by Jack Cade (q.v.), rose against his appointees, who still held the chief offices. They demanded a redress of grievances, and that the Duke of York should be made the head of the Government. The latter was a descendant of Lionel, the third son of Edward III., and consequently by hereditary right his title to the crown was superior to that of Henry VI., who was descended from Edward's fourth son. From this time York was supported by the discontented people and generally opposed by the nobles. During two periods while the King was temporarily insane York was made Protector, but each time the King recovered his reason York was in danger of destruction. In 1455 the battle of Saint Albans was fought between the King's favorite, Somerset, and the Duke of York, in which Henry was taken prisoner. This is generally called the first battle in the War of the Roses (q.v.). After some desultory strife Henry VI. was again captured by the Yorkists in the battle of Northampton, in 1460, and York asserted his claim to the throne. The lords arranged a compromise that Henry should keep the crown, but that York should be acknowledged as his successor. This arrangement only led to a long war, because Margaret was enraged that her son should be deprived of the succession to the crown. She sought aid in the north, raised an army of 18,000 wild warriors, and won the battle of Wakefield, in 1460, where York was slain. But the depredations and cruelties of her rough followers alarmed the people in the south, who rallied to Edward, Earl of March, the son of York. The latter, by his victory at Towton (March, 1461), gained the throne, and was crowned as Edward IV. on June 29, 1461. Margaret and Henry escaped, and there were several engagements before 1465, when Henry was taken prisoner. Margaret was implacable, and finally obtained the aid of the Earl of Warwick (see WARWICK, RICHARD NEVILLE, EARL OF), who in 1470

drove Edward out of England. Henry, although an imbecile, was reinstated as King; but Edward returned in the same year. Henry was captured and died in 1471. There is little doubt that he was murdered by order of Edward. Consult: Gairdner, *Paston Letters* (London, 1872-75); Stubbs, *Constitutional History of England* (Oxford, 1891); Pauli, *Geschichte von England* (Leipzig, 1864-75); Green, *History of the English People* (several editions).

HENRY VII. (1457-1509). King of England from 1485 to 1509. He was born January 28, 1457, at Pembroke Castle, the son of Edmund Tudor, Earl of Richmond, and Margaret, granddaughter of John of Gaunt, founder of the Lancastrian House, from whom Henry derived his title to the crown. His grandfather was Owen Tudor, a Welsh knight, who married Catharine, widow of Henry V. In 1471, on the death of Henry VI., and Edward, Prince of Wales, Henry became the head of the Lancastrian House. During the reigns of Edward IV. and Richard III., the last Yorkist kings, he took refuge in Brittany, until the crimes of Richard III., who murdered his own nephews, 'the Princes of the Tower' (q.v.), alienated the Yorkist nobility and drove them to accept Henry as Richard's only possible rival. Henry landed at Milford Haven in 1485, and in the battle of Bosworth, August 22d, Richard was defeated and slain. The marriage of Henry with Elizabeth, the Yorkist heiress, cemented the union of the two parties; but Henry was crowned before the marriage and claimed the title of his own right, the first of the Tudor kings.

The numerous disturbances of Henry's reign were due on the whole rather to the instigation of remnants of the Yorkist faction and its foreign supporters than to the disaffection of his subjects at home. The rising of Lovell (1486), the invasions of the impostors Simnel (1487) and Perkin (1495 and 1496-97), found little favor among the English people, and were easily suppressed, but they had important consequences. In order to prevent the Scottish King from taking further part in these intrigues, a marriage was arranged between Margaret, Henry's eldest daughter, and James IV. of Scotland, which led to the accession of a new ruling house in England one hundred years later. In order to guard himself from further invasions from Ireland, a stronghold of the Yorkist party, whence danger usually threatened, Henry was forced to resume the fateful policy of English control which had been abandoned during the Wars of the Roses. In 1494 it was provided that English laws then in force should apply to Ireland. The celebrated Poynings's Law of the same year provides for the supremacy of the English Council over Irish legislation. Foreign affairs occupied much of Henry's attention, since the enemies of France, especially Maximilian of Austria and Ferdinand the Catholic, were anxious for Henry's coöperation; but he was too wily to be led into wars from which they would profit more than he. The negotiations led, however, to the marriage, in 1501, of his eldest son, Arthur, to Catharine, the daughter of Ferdinand and Isabella, and after Arthur's death in 1502 to that prince's brother, Henry VIII., in 1509.

During Henry's reign the royal power rapidly increased. Livery and maintenance (q.v.) were suppressed. The Star Chamber (q.v.) offered an effective means of curbing the turbulent nobles. Henry was avaricious and the wealthy groaned at the heavy taxes; but Parliament was compliant to his will. His power was not based entirely upon force, for he had no standing army, but on the support of the middle classes, to whom his reign brought security and prosperity after the disorders of the Wars of the Roses. He died at Richmond, April 21, 1509. Among the events of the reign of Henry VII. was the discovery of the North American continent by John Cabot.

The best biographical accounts are Gairdner, *Henry VII.* (London, 1889), in "Twelve English Statesmen Series," and two lectures by Bishop Stubbs in *Lectures* (Oxford, 1887). Five volumes of sources have been printed in the "Rolls Series," under various titles. The admirable French *Histoire générale*, by Lavisse and Rambaud, vol. iv. (Paris, 1894), has a chapter on Henry by M. Bémont, somewhat biographical in character, with a bibliography. Bacon's *Henry VII.* is still of interest. Consult: Lingard, *History of England*, vol. iv. (London, 1854); Green, *History of the English People*, vol. ii. (New York, 1879); Green, *Short History of the English People*, p. 300 (London and New York, 1894); Hallam, *Constitutional History of England*, vol. i. (London, 1855); Traill (editor), *Social England*, vol. ii. (London and New York, 1894), with bibliography.

HENRY VIII. (1491-1547). King of England from 1509 to 1547. He was the second son of Henry VII. and Elizabeth of York, and was born at Greenwich, June 28, 1491. He was intended for the Church until, at the age of eleven, he became heir apparent to the English crown on the death of his brother Arthur, in 1502. In the following year he was betrothed to Catharine of Aragon, Arthur's widow, a Papal dispensation having been obtained from Julius II. on account of their relationship. The marriage was to have taken place on the completion of Henry's fourteenth year; but Henry VII. was playing a wily game of diplomacy with Ferdinand, Catharine's father, and postponed the wedding on various pretexts in order to extort concessions. He even caused his son to protest that the whole arrangement was against his will. On April 21, 1509, Henry succeeded to the crown, at the age of eighteen. On June 11th he married Catharine, and they were crowned together on June 24th. Although she was six years his senior, their marriage was for many years a happy one. For some time after his accession Henry gave himself up to festivities and sports. He was described in 1519 by Giustiniani, the Venetian Ambassador, as the handsomest and best-dressed prince in Europe. "He is very accomplished, a good musician, composes well, is a most capital horseman, a fine jouster, speaks good French, Latin, and Spanish, is very religious, hears three masses daily when he hunts, and sometimes five on other days. . . . He is very fond of hunting, and never takes his diversion without tiring eight or ten horses, which he causes to be stationed beforehand along the line of country he means to take, and when one is tired he mounts another, and before he gets home they are all exhausted." On account of his handsome person, his hearty, generous manners, his fondness for the services of the Church, and his appreciation of the new learning, Henry

was a favorite with all classes of the English people. He chose his ministers with rare sagacity, and, in spite of his gayety, knew what was going on in his administration. He had a violent temper, and no monarch ever held his servants under firmer control. Until 1529 affairs were in the hands of Wolsey (q.v.), whom Henry had raised from a humble station to be Archbishop of York (1514) and Chancellor (1515), and caused to be appointed cardinal (1515) and legate *a latere* (1518). Wolsey had thus in his hands almost supreme power over Church and State, and he rivaled the King in outward splendor; yet no one was in doubt as to who was the real master. Wolsey's precarious tenure depended upon his ability to fulfill, and if possible to anticipate, his young master's wishes.

During approximately the first half of Henry's reign, before the matter of the King's divorce became urgent, his attention was occupied with foreign affairs. After 1519 Europe was divided into two hostile camps by the rivalry between Charles V. and Francis I. Henry could be depended upon in the long run to take the side of Charles, not only on account of his relationship, having married Charles's aunt, and the close commercial relations between England and Charles's possessions in the Low Countries, but because Henry dreamed of renewing the Hundred Years' War and rivaling the deeds of Edward III. and Henry V. For these reasons, Henry always opposed Francis when it came to actual warfare, though he frequently changed sides in the diplomatic struggle. Even before the accession of Charles V. and Francis I., the relations of their predecessors had been much the same, and in 1511 Henry had been drawn into the Holy League between the Papacy, Spain, Austria, and Venice against France. Early in 1512 Henry had sent an abortive expedition to regain Guienne. In the following year he took part in person in the triumphant campaign in Northern France. The French were defeated at Guinegate, August 16th, in what is known as 'the Battle of the Spurs,' from the rapidity of the French flight; Thérouanne surrendered August 24th, and Tournay September 25th. James IV. of Scotland, taking advantage of Henry's employment elsewhere, invaded England, and was defeated and slain at Flodden, September 9, 1513. Henry fully intended to renew the campaign the next year; but when he learned that both Ferdinand of Spain and Maximilian of Germany had deserted him, he secretly made peace, which was cemented by the marriage of his sister Mary with Louis XII. From this time until the outbreak of the first war between Francis and Charles (1521), Wolsey was free to carry out with tolerable success his favorite policy of mediation between the two rivals. There were many interviews, among others the famous 'Field of the Cloth of Gold' (1520), and much treachery on all sides; but in the end Wolsey's peace policy had to give way before Henry's warlike spirit. There were campaigns against France in 1522 and 1523; but they had no other result than an increased taxation at home, for which Wolsey was popularly held accountable. In 1525 Francis was not only defeated at Pavia, but taken prisoner, and Henry thought that the time had come to recover the crown of France. With this purpose in view, he demanded an immediate loan from his subjects in proportion to their incomes, but at so extortionate a rate that riots broke out and the loan had to be recalled. Henry, as was his wont, meanly threw the odium upon Wolsey, who was in no wise responsible. The failure of the loan made peace with France necessary, which was signed in 1525. In the following year Francis regained his freedom upon agreeing to Charles's extortionate demands; but he held himself not bound by forced concessions, and war broke out anew (1527-29), in which he found an ally in Pope Clement VII. Henry took no direct part in this war, but he was anxious to join the French and Papal side, for the reason that he was meditating the divorce of Catharine of Aragon, to which the consent of the Pope was necessary.

For some years Henry had been growing tired of Catharine, and his indifference increased after the appearance at Court in 1522 of the young and sprightly Irish beauty, Anne Boleyn. In addition, Catharine's only surviving child was her daughter Mary, and since no queen had ever sat upon the throne of England, it might reasonably be doubted whether the succession was safe without a male heir. Henry's professed motive, however, was conscientious scruples concerning the validity of his marriage with his brother Arthur's wife, notwithstanding the Pope's dispensation, and in 1527 he asked Clement VII. not merely to grant him a divorce, but to declare that the dispensation of Julius II. was invalid, and that the marriage with Catharine had been void from the beginning. Apart from other considerations, Clement VII. could hardly be expected to impair his own authority by such a ruling; nor was the time propitious for such a request, for in the year in which it was made the Imperial troops had sacked Rome, and Clement VII. was at the mercy of Charles V. The most that Henry could obtain was a legatine court, composed of Wolsey and Campeggio; but the Pope's sole purpose in granting it was delay. Campeggio could neither induce Henry to change his mind nor Catharine to yield, and in 1529 Clement revoked the case to Rome, where Henry knew that it would be useless to press the matter further, especially as Charles and Clement were now in alliance. The result was the fall of Wolsey, and the beginning of momentous changes in the relations between the State and Church in England. Henry probably little realized the importance of the steps which he took in order to satisfy his lust. He certainly did not intend to introduce Protestantism, for which he had an aversion. He was no mean theologian, and in 1521 he had written a book against Luther entitled *Assertio Septem Sacramentorum*, which won for him, by the irony of fate, the Papal title 'defender of the faith,' which English sovereigns have borne to the present day. In 1530 Henry was occupied with Cranmer's suggestion that the favorable opinion of the learned doctors of the universities as to the nullity of the marriage would leave him free to marry again without the Pope's consent. Bribery and cajolery were freely used with considerable success; but in 1531 Henry proceeded to more vigorous measures. Upon the suggestion of Thomas Cromwell, an adventurer, who rose to influence soon after Wolsey's fall, he conceived the plan of seizing the Papal authority and revenue in England, thereby not only securing the divorce, but vastly increasing the

resources and power of the Crown. Henry accused the clergy of having violated the Statute of Præmunire (q.v.) in accepting Wolsey's legatine authority, although they would have met with swift punishment if they had presumed to act otherwise, and although Henry himself had called in the legate Campeggio a short time before. Large numbers of the laity were also equally involved; but this was merely a violent and unscrupulous method of securing the clergy at home before proceeding against the authority of the Pope. Henry's complete success and the very moderate resistance of the clergy show how times had changed since the days of Henry II. and Thomas of Canterbury. The Pope had never fully regained his prestige after the movement of Wicliff; and the English clergy were not only wealthy and therefore timid, but since Wolsey as Royal Chancellor and Papal legate had practically united supreme power in State and Church, they had grown compliant to the royal will. The Convocation of Canterbury offered a gift of £100,000 (equal to at least £2,000,000 at the present day) to be freed from the penalties of præmunire, which involved the confiscation of all their property. Henry demanded in addition that he be recognized as the supreme head of the Church of England, which after some resistance they accepted with the vague qualification, "so far as is permitted by the law of Christ." The Convocation of York soon after bought its pardon on the same condition and the payment of £18,000. Henry found support in these measures in Parliament, whose elections he practically controlled, and whose members were either lawyers or country squires, with little affection for the Church. In 1532 the clergy submitted its entire body of canons to the King's examination, and renounced the right to make new canons without royal permission, thus putting an end forever to the freedom of the English Church. In 1533 Henry made retreat impossible by secretly marrying Anne Boleyn without a divorce. In the same year he made Cranmer, an able but compliant and vacillating churchman, Archbishop of Canterbury, who on May 23d decided that Henry's marriage with Catharine was void, and on May 28th that his secret marriage with Anne was lawful. About a year after, Clement decided in favor of Catharine, but not until Henry, foreseeing the result, had all but severed the connection between the English Church and Rome. In 1534 Parliament changed the provisional Act of Annates of 1532 into an unconditional one, giving the King the annates or first fruits which were formerly paid to the Pope. It also provided for the appointment of bishops without reference to Papal authority, and abolished appeals to Rome. Henceforth the Pope was merely 'the Bishop of Rome,' with no more authority in England than any other foreign bishop.

The new royal supremacy found its first expression in three acts which, taken together, assumed an intolerably tyrannical character. The first act of succession of 1533 not only fixed the inheritance to the crown in the issue of Anne Boleyn, and declared that the marriage with Catharine was invalid from the beginning, but required all subjects to take oath affirming their full acceptance of the contents of the act, which no Catholic could conscientiously do; and it further declared that any one who refused should be guilty of high treason. The act of supremacy and the treason act of the following year confirmed the royal title 'supreme head of the Church of England,' and declared that any one who should deprive the King of his title should be guilty of high treason. The King thus tried not only to rule over men's actions, but over their consciences. Numerous victims met a traitor's death for refusing to swear that Catharine's marriage was unlawful, though otherwise they were willing to accept the new succession. With incredible callousness, Henry sent to the block Sir Thomas More, his former friend and boon companion, one of the ornaments of the age, and Fisher, whom the Pope shortly before had made cardinal. Many friars were burned merely for refusing to take the oath on conscientious grounds. Some of them had spoken against the King's second marriage, but others had not. In 1536 Anne was executed, on charges of which we have no proof. Ten days later Henry married Jane Seymour, and a new act of succession made it treasonable to affirm what it was formerly treasonable to deny.

The resistance of the friars no doubt helped to call the attention of Cromwell, who had been made vicar-general in ecclesiastical matters in 1535, to the rich booty to be acquired through the dissolution of the monasteries, at that time widely established throughout England. He ventured at first to despoil only the lesser houses. A royal visitation of the year 1535 made the convenient discovery that monasteries "where the congregation of such religious persons is under the number of twelve persons" were the seats of "manifest sin, vicious, carnal, and abominable living," while those with more than twelve persons were not. Parliament thereupon (1536) dissolved the smaller houses and gave their property to the King. The Catholic rising in the northern and more conservative districts in 1536, known as the 'Pilgrimage of Grace,' involved some of the remaining abbots of that region, and this was a signal for the dissolution of the greater monasteries. Those who were implicated in the revolt were executed for treason, and the others were gradually frightened into surrendering their authority and property into the hands of the King, "of their own free and voluntary minds, good wills and assents, without constraint, coercion, or compulsion of any manner of person or persons," as the Parliamentary act of 1539 puts it. Henry used the enormous spoils of the monasteries partly for religious objects, partly for military purposes; but much was granted to royal favorites, and many prominent families in England at the present day derive their fortunes from this source. One of the unexpected consequences of the dissolution was the formation of a considerable party keenly interested in maintaining the religious innovations.

It was not, however, Henry's first intention to introduce religious innovations, other than the royal supremacy. If More and Fisher were beheaded for denying the royal supremacy, John Frith was burned for denying the doctrine of transubstantiation. Yet preachers with Protestant tendencies were appearing and criticising the old order of things with great asperity. To prevent these disturbances, the Ten Articles were promulgated in 1536 by royal order, containing a creed which in the main held to the old order, yet

passed over in silence or tried to explain some of the controverted points. In the same year the Bible was translated with royal sanction, though Henry apparently took no great interest in it. The new movement was sure to grow. Its intellectual leader was Cranmer, who was himself under the influence of Ridley. Cranmer and Ridley were slowly changing their views in the direction of Protestantism. Cromwell also favored Protestantism, for political reasons. In 1538 there was much smashing of images and spoliation of tombs, until Henry took alarm. In 1539 he issued, with the consent of Parliament, the reactionary Six Articles, affirming the principal controverted Catholic dogmas. Englishmen found it as dangerous to be too Protestant as too Catholic, and the discreet conformed to Henry's somewhat shifting views. In 1544 Cranmer wrote his celebrated Litany, and ordered certain parts of the service to be said in English; but further changes were cut short by Henry's death.

In the meantime Cromwell had come to grief through his arrangement of the marriage of Henry to Anne of Cleves, in order to form a connection with the Protestant princes of Germany. When Anne reached England she was found to be far from handsome, and Henry's resentment was great. This is supposed to be the real reason for Cromwell's disgrace and execution, July 28, 1540, though Henry may have grown tired of Cromwell as he grew tired of every one else. On the day of Cromwell's execution Henry married Catharine Howard, Anne having been divorced shortly before; but she was soon found to have been unfaithful both before and after her marriage, and was beheaded. In 1543 Henry married his sixth wife, Catharine Parr, who survived him.

In Henry's last years his attention was again occupied with foreign enterprises. He tried to establish his authority in Ireland by winning over the native chiefs, stripping the Irish monasteries for their benefit. From 1542 to 1546 he was at war with Scotland and France. The Scots were defeated at Solway Moss in 1542, and James V. died soon after. Henry took Boulogne in 1544, and made peace two years later. He died January 28, 1547. By act of Parliament, in 1544, the succession had been given to his three children, Edward, Mary, and Elizabeth, the offspring respectively of Jane Seymour, Catharine of Aragon, and Anne Boleyn, who succeeded in this order and died without issue.

Consult: *Calendar of State Papers, Foreign and Domestic, of the Reign of Henry VIII.*, edited by Brewer and Gairdner (14 vols., London, 1862-95); *State Papers During the Reign of Henry VIII.* (11 vols., London, 1832-52); *Parliamentary History* (36 vols., London, 1806-20); Giustiniani's Venetian dispatches, published in translation by Rawdon Brown under the title *Four Years at the Court of Henry VIII.*; Pocock, Nicholas, *Records of the Reformation and the Divorce* (2 vols., Oxford, 1870); *Original Letters Relative to the English Reformation*, edited by Robinson for the Parker Society (2 vols., Cambridge, 1846); Ellis, *Original Letters* (first series, 3 vols., London, 1824; second series, 4 vols., London, 1827; third series, 4 vols., London, 1846); Brewer, *History of the Reign of Henry VIII. from His Accession to the Death of Wolsey* (2 vols., London, 1884); Dixon, *History of the Church of England from the Abolition of the Roman Jurisdiction* (4 vols., London, 1884-91); Lingard, *History of England* (10 vols., London, 1854-55), vols. iv., v.; Froude, *History of England from the Fall of Wolsey to the Death of Elizabeth*, vols. i.-iv. (12 vols., New York, 1870); id., *The Divorce of Catherine of Aragon* (New York, 1891); Green, *History of the English People* (4 vols., New York, 1879), and his *Short History* (London and New York, 1894). Two convenient collections of the principal documents are: Gee and Hardy, *Documents Illustrative of English Church History* (London and New York, 1896), and Adams and Stephens, *Select Documents of English Constitutional History* (New York, 1901).

HENRY I. (c.1008-60). King of France from 1031 to 1060. He was the son of Robert I., and a grandson of Hugh Capet. The first years of his reign were disturbed by a rebellion headed by his mother, Constance of Toulouse, who, however, submitted in 1033. In the disorders which followed the death of Robert the Devil, Duke of Normandy, in 1035, Henry assisted William the Bastard, the illegitimate son and successor of Robert, in establishing his authority over the rebellious Norman nobles, participating in the battle of Val-ès-dunes in 1047. Subsequently Henry grew jealous of the power of the Norman Duke. Leaguing himself with the Count of Anjou, and calling his brother Eudes into the field, he invaded Normandy from Evreux in 1054. When, however, Eudes had been defeated at Mortemer, Henry drew back in haste and left the Normans to themselves. In 1055 he caused his eldest son, Philip, to be crowned as joint King. Henry died in 1060. He was an active prince, who spent a large part of his time in the field, upholding the royal authority against the feudal nobles. His first wife, Mathilda, niece of Henry III. of Germany, died childless; his second wife, Anne, daughter of Jaroslaff, Prince of Novgorod and Kiev, bore him three sons—Philip, his successor; Robert, who died in childhood; and Hugh, Count of Vermandois. Consult Soehnée, *Etude sur la vie et le règne de Henri I.* (Paris, 1891).

HENRY II. (1519-59). King of France from 1547 to 1559. He was born March 31, 1519, being the second of three sons of Francis I. by his first wife, Claude. From 1526 to 1529 Prince Henry was a hostage in Spain, together with his brother, the Dauphin Francis. In 1533 he married Catharine de' Medici and in 1536 the death of the Dauphin Francis made him the heir apparent to the throne. The same year he became the lover of the celebrated Diane of Poitiers, a woman several years his senior, but of attractive mind and strong will. In 1547 Henry succeeded his father, Francis I., and at once submitted himself to the influence of his mistress and of Anne de Montmorency, Constable of France, though the Guises also enjoyed a large share of the royal favor. A revolt in Guienne, where the people had risen against the *gabelcurs*, or collectors of the salt duty, was speedily put down by Montmorency. In 1550 Boulogne, which had been taken by the English during the wars of Henry VIII., was recovered by the French, and in a second war, which began in 1557, the English lost Calais and Guines, their last possessions in France (1558). Though a strong Catholic

and a persecutor of the Huguenots, Henry made treaties of alliance with the German Protestants, led an army of 38,000 men to aid Maurice of Saxony against the Emperor, and made himself master of the bishoprics of Toul and Verdun, while Montmorency seized Metz by treachery (1552). After the abdication of Charles V. (1555-56) Henry embraced the opportunity of attacking the Netherlands and Italy before Philip II. could consolidate his newly acquired possessions; but the results of this step were disastrous to France at every point. In Italy, the attack on Naples, made by Guise at the head of 20,000 men, utterly failed; while in the Low Countries the French under Montmorency sustained a total defeat, August 10, 1557, at Saint Quentin, and were forced to abandon the town to the Spaniards. This was followed by the defeat of De Thermes at Gravelines in 1558, which with other causes led to the Treaty of Cateau-Cambrésis, April 2-3, 1559. On June 29th Henry II. was mortally wounded in a tournament by Count Montgomery, the captain of his Scottish Guards, and died July 10, 1559. He is represented by historians as a bold and handsome man, but cold and indolent. His Queen, Catharine de' Medici, bore him ten children, of whom three lived to be kings of France. He was succeeded by his eldest son, who became Francis II. Consult: The contemporary memoirs of Monthieu, Tavannes, Vieilleville, Villars, and Brantôme; also, Barre-Duparcq, *Histoire de Henri II.* (Paris, 1887); Ranke, *Civil Wars and Monarchy in France in the Sixteenth and Seventeenth Centuries* (trans. London, 1852-61). See, also, FRANCE; and consult the authorities referred to there.

HENRY III. (1551-89). King of France from 1574 to 1589. He was the third son of Henry II. and Catharine de' Medici, and was the last of the House of Valois. He was born at Fontainebleau, September 19, 1551, and in his youth bore the title of Duke of Anjou. At the age of sixteen he was made a lieutenant-general, and placed in nominal command of the armies of France, though the real direction of operations was in the hands of Marshal de Tavannes. Henry had a part in the victories over the Huguenots at Jarnac and Moncontour in 1569, and was active in abetting the massacre of Saint Bartholomew. He was elected King of Poland in 1573, but upon receiving news of the death of his brother, Charles IX., in the following year, he fled from Cracow to make certain his succession in France. As King he continued the war against the Huguenots; but the union of the party of his brother, the Duke of Alençon, with the Huguenots wrung from the alarmed King the Peace of Beaulieu (or of Monsieur) in 1576, confirmed by the Edict of Poitiers or Bergerac in 1577. This peace granted so many privileges to the Huguenots that it exasperated the Catholic Party and led to the formation of the Holy League, the avowed object of which was to maintain the supremacy of Catholicism, and the secret purpose to secure the reversion of the throne to the Guises. Meanwhile the King forfeited all respect by the indulgence of his vicious propensities. His life was marked by alternate outbursts of licentiousness and moods of gloomy fanaticism. The affection he lavished upon his effeminate favorites, or *mignons*, as they were called, aroused the disgust of the nation. A renewed war with the Huguenots (1579-80) was concluded by the Peace of Fleix, a renewal of the terms of that of Bergerac. The strength of the League grew rapidly, aided by the popularity of the Duke of Guise with the Catholic masses. By the death of the Duke of Anjou (formerly of Alençon), Henry of Navarre became heir to the throne (1584); but the Catholics would not accept him, and Henry III., after an attempt to come to an understanding with his cousin of Navarre, issued the Edict of Nemours (1585), repealing all privileges granted the Huguenots. The so-called 'War of the Three Henrys' then broke out. In 1587 the Huguenots under Henry of Navarre triumphed at Coutras. King Henry found that Henry of Guise, through his commanding position, was becoming master of the kingdom. On May 12, 1588, the so-called Day of the Barricades, the inhabitants of Paris rose against the royal forces, and were quelled only by the interposition of Guise. The King fled to Blois, convoked the Estates, and summoned Guise to a private audience. Guise was assassinated in the King's cabinet by the guards known as the 'Forty-five' (December 23, 1588); and his brother, the Cardinal of Lorraine, was put to death on the following day. This double assassination aroused the hatred of Catholic France. The doctors of the Sorbonne declared the people to be relieved of the duty of obedience to the King, and the heads of the League dissolved the Parliament. Henry was distracted by the difficulties of his position, and threw himself under the protection of Henry of Navarre. The two kings advanced at the head of an army of 40,000 Huguenots on Paris, which would probably have had to capitulate had not Henry III. been assassinated, August 1, 1589, by a fanatical young Dominican, named Jacques Clément. The murderer was slain on the spot by the royal guard, and the King died on the following day, after having declared Henry of Navarre his successor.

Consult: The *Memoirs* of Tavannes, Vieilleville, Castelnau, Brantôme, and De Thou; also Freer, *Henry III., His Court and Times* (3 vols., London, 1858); Jackson, *The Last of the Valois and the Accession of Henry of Navarre* (2 vols., London, 1888); Ranke, *Civil Wars and Monarchy in France in the Sixteenth and Seventeenth Centuries* (2 vols., Eng. trans., London, 1852); E. Armstrong, *The French Wars of Religion, 1559-98* (London, 1892); De Noailles, *Henri de Valois et la Pologne* (3 vols., Paris, 1867); De la Barre-Duparcq, *Histoire de Henri III.* (Paris, 1882); Robiquet *Paris et la Ligue sous Henri III.* (Paris, 1886); Nolhac and Salerti, *Il viaggio in Italia di Enrico III., re di Francia* (Turin, 1890). See FRANCE; HUGUENOTS.

HENRY IV. (1553-1610). King of France from 1589 to 1610, sometimes called the Great. He was born in the Castle of Pau, Béarn, December 14, 1553, being the third son of Antoine de Bourbon and Jeanne d'Albret, daughter and heiress of Henry II., King of Navarre and Béarn, and allied through his father with the French royal family. In 1555 his mother became Queen of Navarre, and gave her husband the title of King. Henry himself was known as Prince of Viane. His father's death, in 1562, placed him under the sole control of his mother who was a zealous Calvinist, and was careful to select learned men holding her own tenets for his instructors. Upon the outbreak of the third Civil War in France

the young prince and his intrepid mother joined the Huguenots at La Rochelle, and after the death of the Prince of Condé at Jarnac (March 13, 1569), Henry was proclaimed by the voice of the army chief of the Protestant cause. On account of his extreme youth, however, the actual command was vested in Coligny (q.v.). Notwithstanding the defeats which the Huguenots had experienced in this campaign, the Peace of Saint Germain-en-Laye (August 8, 1570) was apparently of great advantage to them, and was speedily followed by a contract of marriage between Henry of Navarre and Margaret of Valois, the sister of Charles IX. Jeanne d'Albret died suddenly a few months later (June 9, 1572), and the prospective bridegroom became King of Navarre, under the title of Henry III. After much opposition on the part of both Catholics and Protestants, the marriage with Margaret of Valois was celebrated with great pomp, August 18, 1572, followed within a week by the massacre of Saint Bartholomew. It had been originally intended that Henry should share the fate of his friends and co-religionists, but his life was spared on condition of his professing himself a Catholic. For more than three years he remained at the French Court, virtually a prisoner, and continually plotting and seeking to escape; but at length, in February, 1576, he contrived to elude the vigilance of his guardians, and made his way to the camp of the Huguenots in Gascony, where he repudiated his enforced conversion and resumed the command of the army. In the Peace of Beaulieu, concluded May 6, 1576, the Huguenots obtained several distinct advantages.

The death of the Duke of Anjou (late Alençon) in 1584 made Henry presumptive heir to the crown. Some years previous to this the Catholic League had been formed, the secret purpose of which was the support of the Guise pretensions to the throne. The War of the Three Henrys (Henry III. of France, Henry of Navarre, and Henry of Guise) was terminated by the Protestant victory of Coutras, October 20, 1587. In 1588 Henry III. of France, hating and fearing the powerful Guises, who had virtually made themselves his masters, caused the Duke of Guise and the Cardinal de Lorraine to be murdered, and in the following year came to an understanding with Henry of Navarre. The two now proceeded to lay siege to Paris, August, 1589. The assassination of Henry III. by Clément made Henry of Navarre, as the nearest lineal male descendant of the royal house of France, rightful King of France, the House of Bourbon succeeding to that of Valois. As a Protestant, he had been excommunicated by Sixtus V. in 1585, and declared incapable of succeeding to the French crown. His religion, moreover, made him obnoxious to the greater part of the nation, and he found in addition that the dukes of Lorraine and Savoy, and Philip II. of Spain, were prepared, each on his own account, to dispute his claims. He withdrew, therefore, to Normandy until he could collect more troops and obtain reënforcements from England and Germany. His nearly hopeless cause, however, gradually gained strength through the weakness and internal dissensions of the Leaguers, who proclaimed the aged Cardinal de Bourbon King, with the Duke of Mayenne Lieutenant-General of the Kingdom, and thus complicated the interests of their party. After a success at Arques (September, 1589), Henry reappeared before Paris. He won a splendid victory over Mayenne at Ivry (March 14, 1590), but Spanish intervention defeated his plans, and it is probable that he would never have been generally acknowledged had he not, by the advice of his friend and Minister, De Rosny, afterwards Duke of Sully (q.v.), formally professed himself a member of the Church of Rome, in 1593. "Paris," the light-hearted but astute monarch is reported to have said, "is well worth a mass." His public recantation of Protestantism, before the Archbishop of Bourges, July 25, 1593, filled the Catholics with joy, and was followed by the speedy surrender of the most important cities of the kingdom, including Paris, which opened its gates to him in March, 1594. The war with the League was not, however, terminated till 1596. In 1598 peace was concluded between Spain and France by the Treaty of Vervins, which restored to the latter many important places in Picardy and was otherwise favorable to the French King. On April, 13, 1598, Henry signed the Edict of Nantes, which secured the Protestants perfect liberty of conscience and the administration of impartial justice.

Henry was now left at liberty to direct his attention to the internal improvement of the kingdom, which had been thoroughly disorganized through the long continuance of civil war. The narrow-minded policy of the preceding reigns had left the provinces greatly at the mercy of the civil governors and large landed proprietors, who arrogated almost sovereign power to themselves in raising taxes and exacting compulsory services. Such abuses Henry completely stopped. By building canals and roads, and opening all parts of his kingdom to commerce, he established new sources of wealth and prosperity for his subjects. The mainspring of these improvements was, however, the reorganization of the finances under Sully, who, in the course of ten years, reduced the national debt from 330,000,000 to 50,000,000 livres. In 1601 the districts of Bresse, Bugey, and Valromey were acquired from Savoy and added to France. For ten years France enjoyed prosperity previously unheard of. In foreign politics Henry devoted his entire energy to the formation of a powerful coalition against the House of Austria, the ancient enemy of France, against whom, since the Treaty of Cateau-Cambrésis in 1559, the distracted country had been too weak to contend. The disputed succession to the duchies of Jülich and Cleves (qq.v.) afforded an opportunity for the opening of hostilities, and the King, who had entered into an alliance with the Protestant Union of Germany, was about to take personal command of the French army, when he was struck down by the dagger of Ravaillac, a religious fanatic, at Paris, May 14, 1610. Nineteen times before attempts had been made on his life, most of which it was thought could be traced to the agency of the Papal and Imperial courts, and in the midst of the bitter political strife Ravaillac's crime was laid to the charge of the same influences. The most horrible vengeance was wreaked on the murderer. Henry was succeeded on the throne by Louis XIII., his son by his second wife, Maria de' Medici (q.v.). Time has strengthened the high estimate which the people of France formed of their favorite King, for although his faults were numerous, they were eclipsed by his surpassing qualities. An inordinate passion for women was

his greatest failing. He was without doubt the most imposing figure in France of his day, and has taken his place in history as the greatest of Bourbon kings.

BIBLIOGRAPHY. For the history of Henry IV., consult the memoirs of the time, particularly those of the Duke de Sully (Amsterdam, 1725); also Poirson, *Histoire de Henri IV.* (3d ed., Paris, 1865); Jung, *Henri IV. écrivain* (ib., 1885); Guadet, *Henri IV., sa vie, son œuvre et ses écrits* (ib., 1879); Lescure, *Vie de Henri IV.* (ib., 1876); Barre-Duparcq, *Histoire de Henri IV.* (ib., 1884); Rambault, *Henri IV. et son œuvre* (ib., 1884); Zeller, *Henri IV. et Marie de Médici* (ib., 1877); Lacombe, *Henri IV. et sa politique* (ib., 1878). In English the following works may be consulted: Gurney, "Henry IV.," in *Chapters from French History* (London, 1870); Baird, *The Huguenots and Henry of Navarre* (New York, 1886); Jackson, *The First of the Bourbons* (London, 1890); Willert, *Henry of Navarre and the Huguenots in France* (New York, 1893).

HENRY V. OF FRANCE. See CHAMBORD, DUKE OF.

HENRY IV. An historical play by William Shakespeare, in two parts, produced in 1597 and 1598, printed in 1598 and 1600. The sources are Holinshed's *Chronicles* and a popular old play (produced in 1588), *The Famous Victories of Henry V.* In it the royal hero, who had appeared as a spirited youth in *Richard II.*, is represented as a care-worn monarch, who has passed down his boyish fire to his son, Prince Hal. The plot deals with Hotspur's rebellion and the sobering of the Prince's character through the tempering process of his nation's trial. See FALSTAFF.

HENRY V. An historical drama by William Shakespeare, a continuation of Henry IV., and derived from the same sources. It deals with the adventures of Prince Hal after he ascended the throne, especially with his invasion of France, and tells of the death of Henry's former boon companion, Falstaff. It was performed in 1599, and was printed in 1600, imperfectly, by Thomas Creede.

HENRY VI. An historical drama in three parts, produced in 1592-94, and printed in 1594-95, in which Shakespeare's genius can be traced, working over the cruder stuff of possibly Marlowe, Peele, Lodge, Kyd, and Greene or some unknown dramatists. It deals with the early years of Henry VI.'s reign, his misfortunes during the Wars of the Roses, and his tragic death. The first part was produced in 1592, and called forth Greene's charge of plagiarism in his *Groat's Worth of Wit.* The second part, founded on an old play, *The First Part of the Contention Between the Two Famous Houses of Yorke and Lancaster*, and the third part, founded on *The True Tragedie of Richard, Duke of Yorke*, were evidently elaborated and adapted by Shakespeare from works by unknown writers.

HENRY VIII. An historical drama, produced in 1613, begun by William Shakespeare and completed by Fletcher and Massinger. It is founded on Holinshed's *Chronicles* and Fox's *Christian Martyrs*, and was first printed in the folio of 1623. Only Act I., Scene 1; Act II., Scenes 3 and 4; Act III., Scene 2; Act IV., Scene 1, can be ascribed to Shakespeare; the rest was written by Fletcher, with possibly some help from Massinger.

HENRY, ALEXANDER (1739-1824). An American fur-trader, born in New Brunswick, N. J. He was with General Amherst in the expedition against the French in Canada (1760). After the peace he went to Michillimackinac to engage in the fur trade, and was one of the few survivors when the English garrison of the fort was massacred by the Indians at the time of Pontiac's uprising (1763). Henry remained for a year a captive among the Ojibways at Sault Ste. Marie, whence he came with an Indian contingent to join General Bradstreet's army on the lakes and by the desertion of his battalion regained his liberty. He resumed the fur trade, voyaging between Montreal and the Rocky Mountains, and from 1770 to 1774 made an unsuccessful attempt to float a company for working the copper-mines on Lake Superior. His book, *Travels and Adventures in Canada and the Indian Territory Between the Years 1760 and 1776* (1809), is quoted at length in Parkman, *Conspiracy of Pontiac* (London, 1868).

HENRY, CALEB SPRAGUE (1804-84). An American Protestant Episcopal clergyman and author. He was born in Rutland, Mass., graduated at Dartmouth in 1825, and studied theology at Andover and New Haven. In 1828 he became a Congregational minister at Greenfield, Mass., and in 1833 removed to Hartford, Conn. In 1834 he started the *American Advocate of Peace*, the organ of the American Peace Society. He then entered the ministry of the Protestant Episcopal Church, and was professor of moral and intellectual philosophy in Bristol College, Pennsylvania (1835-38). In 1837, with the aid of Rev. Francis L. Hawks, he established the New York *Review*. He was professor of history and philosophy in the New York University from 1839 to 1852. Later he held other pastorates, but was chiefly engaged in literary work. He translated Guizot's *History of Civilization*, and other works from the French, and was the author of several works, including *Compendium of Christian Antiquities* (1837), and *Satan as a Moral Philosopher* (1877).

HENRY, CAPE. See CAPE HENRY.

HENRY, äN'rē', CHARLES (1859—). A French librarian and editor. He was born at Bollwiller, Haut-Rhin, and was educated in Paris, where, in 1881, he became assistant and afterwards librarian in the Sorbonne. As a specialist in the history of mathematics he was sent to Italy to seek some manuscripts of that nature which the Government wished to publish. He edited several works upon kindred subjects, as well as memoirs, letters, and other volumes, and wrote critiques upon the musical theories of Rameau and Wronski. C. Huet's correspondence he published under the title *Un érudit, homme du monde, homme d'église, homme de cour* (1880), and he issued also *Problèmes de géométrie pratique* (1884); and *Lettres inédites de Mlle. de Lespinasse à Condorcet et à D'Alembert* (1887).

HENRY, EDWARD LAMSON (1841—). An American historical and genre painter. He was born in Charleston, S. C., January 12, 1841, and studied at the Philadelphia Academy with Peter Weber, and from 1860 to 1863 with Suisse and Courbet in Paris. He returned to the United States during the Civil War, and sketched on

the James River. In 1869 he was elected a member of the National Academy, and established a studio in New York. He is also a member of the American Water-Color Society. In 1871, 1875, and 1882 he revisited Europe, sketching in France and England. He received a medal at the New Orleans Exposition in 1884 and at the World's Fair, Chicago, in 1893, and honorable mention at the Paris Exhibition, 1889. His specialty is genre figures, quaintly depicted. The composition is usually well balanced, with elaborate details; the outlines are often hard, and the color crude. One of his largest paintings is the "Initial Excursion of the First Railway Ever Constructed in New York State," Corcoran Gallery, Washington, containing fifty figures. His principal works are: "Old Clock on the Stairs" (1868); "City Point—Grant's Headquarters" (1869), Union League Club, New York; "Battle of Germantown," owned by William Astor; "Declaration of Independence," owned by J. W. Drexel; "Reception to Lafayette," "In Sight of Home," "Waiting for an Answer."

HENRY, äN'rē', Etienne Ossian (1798-1873). A French chemist, son of Noël Etienne Henry (1769-1832), born in Paris, and trained by his father, who was director of the Central Pharmacy of the Parisian hospitals and professor in the School of Pharmacy. In 1824 he became director of the chemical laboratory of the Academy of Medicine. He discovered sinapin and studied mineral waters, milk of various animals, nicotine, and tannin. His works include: *Traité pratique d'analyse chimique des eaux minérales*, with his father (2d ed. 1858); *Mémoire sur l'analyse organique*, with Plisson (1830); *Analyse chimique des eaux de Paris*, with Boutron-Charland (1848); and, with Ratier, a translation of the *Codex Medicamentarius* (1827).

HEN'RY, Joseph (1799-1878). An American physicist, born at Albany, N. Y. He was educated at the Albany Academy, where in 1826 he became professor of mathematics. Henry enjoyed the reputation of being one of the greatest of experimenters, and did more toward the development of the science of electricity than any other American since the time of Franklin. At the Albany Academy he developed the electromagnet, which had been invented a few years previously by Sturgeon of England. By insulating the wire with silk and constructing the apparatus according to certain original ideas, he obtained electromagnets of far greater power and efficiency than those of other experimenters, and also transmitted the current from the battery through a considerable length of wire to the magnet. In 1831 Henry sent a current through a mile of fine copper wire, and caused the armature of the electromagnet to be attracted and strike a bell, thus producing an audible signal. This is the first electromagnet telegraph, and Henry is to be regarded as the inventor of the principle now universally applied in modern practice. In further experiments at Princeton where Henry was appointed professor in 1832 he devised an arrangement of electromagnets and batteries, where the current transmitted to a considerable distance energized a magnet and attracted an armature which opened a 'local' circuit with its battery and caused a powerful electromagnet to perform work by allowing a weight to fall. This experiment contains the principle of the telegraph relay which made possible telegraphy over considerable distances. The apparatus was set up between Henry's residence and laboratory at Princeton, and the earth was used as a return conductor for the first time. Henry was also the first to employ magnetic attraction and repulsion to produce motion, and constructed a simple magnetic engine which had the first automatic pole-changer or commutator ever applied to the galvanic battery.

In the discovery of magnetic induction Henry was anticipated by Faraday (q.v.), but he was the first to notice the similar phenomenon of self-induction. He also investigated the oscillations of electric discharges and other electrical phenomena. In 1846 he was chosen secretary of the Smithsonian Institution at Washington, a position that he held until his death. In 1849 he was elected president of the American Association for the Advancement of Science, and in 1858 he was chosen president of the National Academy of Sciences, of which body he was an original member. Upon the establishment of the Lighthouse Board in 1852 Professor Henry was appointed a member, and in 1871 became its head. He carried on in this capacity a number of important tests for the Government which resulted in the improvement of fog-signals and the various lights and lighthouses. He was also interested in meteorology, and in his reports, as secretary, he urged the Government to collect and distribute meteorological information. He suggested the use of the telegraph for this purpose, and for a number of years this important work was under the direction of the Smithsonian Institution. Terrestrial magnetism was also a subject of interest to Henry, and he not only participated in investigations on his own account, but urged upon the Government the importance of having such observations made. In acoustics, Professor Henry also carried on important researches, his attention being directed to this subject largely through his experiments with fog-signals. Henry enjoyed no small amount of European reputation, and in his trips abroad was enthusiastically received by English and Continental scientists.

Henry was involved in a controversy with S. F. B. Morse (q.v.) as regards the invention of the telegraph, but it is safe to state that the former is to be regarded as the originator of the principle, while Morse invented the instrument first used for this purpose. Henry's collected writings are to be found in the *Smithsonian Miscellaneous Collection*, vol. xxx. (Washington, 1887). In volumes xx. and xxi. of the same series are to be found excellent biographical and memorial notices. Consult also Dickerson, *Joseph Henry and the Magnetic Telegraph* (New York, 1885).

HENRY, Matthew (1662-1714). An English Nonconformist divine and Bible commentator. He was born in Flintshire, near Chester, October 18, 1662. Having qualified himself for the ministry, in 1687 he was settled as pastor of a congregation of Dissenters at Chester, where he continued for twenty-five years. In May, 1712, he removed to a charge at Hackney, near London. He died June 22, 1714. His principal work is an *Exposition of the Old and New Testament*, which was commenced in November, 1704, and five volumes appeared in London prior to 1710. He lived to finish it only to the Acts of the Apostles, and the remainder was finished by thirteen Nonconformist ministers, whose names are given

in some of the editions. For many years this was the standard commentary on the Bible. It has been often reprinted; e.g. by Burder and Hughes, with additional matter from Henry's manuscripts (6 vols., London, 1811). Besides his commentary, Henry published numerous volumes, as well as sermons and tracts. His miscellaneous works were republished in London in 1830. For his life, consult: Williams (London, 1865); *Diaries and Letters of Philip Henry* (his father), edited by Lee (ib., 1883).

HENRY, Patrick (1736-99). An American orator and statesman, born in Hanover County, Va., May 29, 1736. His father was a native of Scotland, and a cousin of Robertson, the celebrated historian. Patrick was unpromising as a scholar, and when he was fifteen years old he was placed to work with a country tradesman. After a year's apprenticeship he was set up in business with his brother William, but before the end of a year the undertaking had to be abandoned. He was slovenly in dress, and showed no aptitude for business of any kind. At the time that he married the daughter of a farmer, a Miss Shelton, his business had collapsed, and he was wretchedly poor. He next tried farming for two years, but had neither perseverance nor knowledge, and after one more of many failures he opened a store and failed within the next three years. When no customers appeared he would close his store and go fishing. But at intervals he read such books as he could find, and managed to gain a fair idea of Latin and Greek. Having utterly failed in farming and in trade, he made an attempt at the law, and after a period of reading said to have extended over only one month, had the boldness to ask for license to practice. This was granted in 1760, on the condition that he would extend his studies before undertaking to practice. In 1763 he leaped into immediate prominence in his profession. He was then engaged in the place of a more experienced advocate, who refused to continue the defense in a celebrated case known as the 'Parson's Cause,' and by an unexpectedly brilliant speech aroused such intense excitement that the audience seized him and bore him in triumph on their shoulders. (See Parson's Cause.) Thereafter his practice was enormous and his prosperity assured. But he was not satisfied with his legal profession. In 1765 he became a member of the House of Burgesses. At the critical period of the Stamp Act excitement he was comparatively unknown to the Assembly, and the rich planters were scandalized at his presumption in offering to the House the brief resolutions which set forth that the burgesses and the Governor had the exclusive right and power to lay taxes and imposts upon the people of the Colony, and that not alone the Stamp Act, but all acts of Parliament which encroached upon the rights of the Colonies, were unconstitutional and therefore void. A storm of opposition from the conservative members naturally followed, and the resolutions were denounced as extreme, impolitic, and dangerous. In the debate he startled even the radicals by his historic outburst: "Cæsar had his Brutus, Charles the First his Cromwell, and George the Third—" [here he was interrupted by the presiding officer and members with cries of "Treason! treason!"]—"may profit by their example," calmly said the orator, completing the sentence, adding, "If this be treason, make the most of it." The resolutions were adopted by a very small majority. He was now a power in the Colony, replaced the vacillating planters in the leadership, and became the authorized representative of the people against the aristocratic element. In opposition to Parliamentary imposts and in preparing the articles of association to discourage the use of British merchandise, Henry was one of the leaders. He continued his legal business, and, though deficient in legal education, was wonderfully successful before juries. At this time he took an active part in the movement for securing the rights of the Dissenters, which finally culminated in the Religious Freedom Act of 1785, by which the Church of England was disestablished in Virginia. Patrick Henry, with Jefferson and others, was ready to precipitate an open rupture with England. He was especially active in the House of Burgesses, and in May, 1774, took a leading part in those acts of the House with reference to the Boston Port Bill which led to its immediate dissolution by Lord Dunmore. Upon the following day (May 27th) was held the historic meeting of the former burgesses in the Raleigh Tavern, as a result of which came the first Revolutionary convention of Virginia (August, 1774), of which Henry was a member, and by which he was chosen a delegate to the first Continental Congress. In that famous assembly he was hailed as the champion of constitutional liberty, and his wonderful eloquence was at once recognized. He served on the Committee on Trade and Manufactures, on the committee to prepare an address to the King, and on that appointed to draft a statement of the rights of the colonists. Returning thence to Virginia, his prominence was still further enhanced by his work in the Provincial Convention of March, 1775, where he introduced resolutions to organize the militia and put the Colony in an attitude of defense, which met with great opposition. He replied by a speech in which, according to one version, occur the words: "There is no retreat but in submission and slavery. Our chains are already forged. Their clanking may be heard on the plains of Boston. The next gale that sweeps from the north will bring the clash of resounding arms. Our brethren are already in the field. Why stand we here idle? What is it that gentlemen wish? What would they have? Is life so dear or peace so sweet as to be purchased at the price of chains and slavery? Forbid it, Almighty God! I know not what course others may take, but as for me, give me liberty or give me death!" Without an opposing voice the resolutions were adopted, and a committee, with Henry as chairman, was appointed to prepare a plan for the defense of the province. Soon thereafter the royal Governor, Dunmore, caused to be removed on shipboard much of the province's supply of powder. The people took up arms, and being told that the powder would be returned, they at once disbanded. Henry, however, seized the favorable moment, gathered a force of militia, and marched upon Williamsburg to demand the powder or compensation. An agent of Dunmore's met him and paid him £300 for the powder. Henry was denounced for stirring up sedition; but it was too late to talk of loyalty; the province was aroused, and in June Dunmore took refuge on a man-of-war. A convention assembled at Richmond and appointed a committee of public safety with most

extensive powers. Two regiments were enlisted, and Henry was appointed commander of all the forces to be raised. The first collision was at Great Bridge, where the Virginia militia gained a triumph over trained British troops, and drove Dunmore back to his ship. Henry should naturally have been the leader of the troops, but the active command was given to Col. William Woodford. Henry was disappointed and resigned. In the convention of May, 1776, when the delegates to the Continental Congress were instructed to demand the independence of the Colonies, he took an active part and was chosen by that convention one of the committee which prepared the first Constitution of the Commonwealth of Virginia. In that year he was chosen by the convention, which then exercised the power of election later exercised by the Assembly, to be Governor of Virginia, and was reëlected until 1779, when he became ineligible; and more than once during his occupancy of the office the Legislature conferred upon him, in times of crisis, practically dictatorial powers. He returned to the Legislature, in which he served until 1784, and was then once more chosen Governor, serving until 1786, when he finally resigned. In 1788 he was a member of the convention which ratified for Virginia the Federal Constitution, which instrument he vigorously opposed, chiefly on the ground that it failed properly to protect the rights of States and individuals against the extreme centralization of power in the Federal Government. In 1794 he declined a seat in the United States Senate, and in 1795 Washington offered him the position of Secretary of State, but he declined. He also declined the office of Chief Justice of the United States Supreme Court, and Adams's offer of a special mission to France, as well as an election as Governor in 1796. He was elected to the House of Delegates in 1799, but did not live to take his seat, dying on June 6th of that year. Consult: Tyler, *Patrick Henry* (Boston, 1887), in the "American Statesmen Series;" Wirt, *Sketches of the Life and Character of Patrick Henry* (2d ed., Philadelphia, 1818); and William Wirt Henry, *Patrick Henry, Life, Correspondence, and Speeches* (3 vols., New York, 1891).

HENRY, äN'rē', Paul Pierre (1848—). A French astronomer, born at Nancy. He was an assistant at the Paris Observatory (1864) and adjunct astronomer (1876). With his brother, Prosper Mathieu Henry (1849—), who was made titular astronomer in 1893, he did much for the perfection of astronomical photography, in their labor of completing the *Atlas écliptique* of Chacornac. The older brother discovered the Comet III. and the planetoids 126, 141, 152, 159, 164, 177, and 227, and Prosper discovered the planetoids 125, 127, 148, 154, 162, 169, and 186.

HEN'RY, Philip (1631-96). An English Nonconformist clergyman, born in London. He graduated at Oxford in 1652 and was ordained in 1657. His career as a preacher was repeatedly interrupted by the religious persecutions of his time, and it was not until the Act of Toleration was passed in 1687 that he was allowed to pursue his calling unmolested. The remaining years of his life were spent in unceasing labor. His *Diaries and Letters*, published in 1882, gives a detailed account of the Nonconformist life of his period.

HENRY, Robert (1718-90). A Scottish historian, minister of the Established Church. He was born in Saint Ninian's Parish, Stirlingshire; was educated at Edinburgh University, and after a term of school-teaching entered the Church, his first charge being at Carlisle. For the last twenty-two years of his life he was in Edinburgh churches—New and Old Grey Friars—and found opportunity to compile his *History of England on a New Plan* (6 vols., 1771-93), of which the last volume was published after his death. Henry's 'new plan' of grouping social progress in periods is no longer new, and has been followed out with greater accuracy since his time.

HENRY, äN'rē', Victor (1850—). A French philologist, born at Colmar. He studied both law and philology, but finally devoted himself exclusively to the latter, and was appointed professor of grammar and comparative linguistics at the University of Lille. In 1889 he was transferred to a similar position in the faculty of letters at Paris. His writings, which are numerous, cover a wide range of linguistics. Among them special mention may be made of his *Esquisse d'une grammaire de la langue innok* (1878); *Esquisse d'une grammaire raisonnée de la langue aléoute* (1879); *La distribution géographique des langues* (1880); *Etudes afghanes* (1882); *Esquisses morphologiques* (1882-90); *Précis de grammaire comparée du grec et du latin* (Paris, 1888, translated into English by R. T. Elliot, 1890); *Précis de grammaire comparée de l'anglais et de l'allemand* (1893); *Manuel pour étudier le sanscrit védique* (1890); and *Le livre septième de l'Atharva-Véda* (1892).

HENRY, William (1774-1836). An English chemist. He studied chemistry and medicine at the University of Edinburgh, and received the degree of doctor of medicine from that university in 1807. Henry devoted himself mainly to investigations in chemistry and medicine. He was the author of several papers in the *Philosophical Transactions* (chiefly on the chemistry of gases); and his *Elements of Experimental Chemistry*, originally published (1801) under the title of *An Epitome of Chemistry*, passed through numerous editions. He is remembered chiefly as the discoverer of the important general law, according to which the amount of any gas absorbed by any liquid is proportional to the pressure exercised upon the gas, provided no chemical combination takes place between the gas and the liquid.

HENRY, William Wirt (1831-1900). An American lawyer and historical writer. He was born at Red Hill, Charlotte Co., Va.; was educated at the University of Virginia, and was elected to the State Legislature, where he attended four sessions. In addition to the practice of his profession, he was deeply interested in historical studies, and became president of the American Historical Association and of the Virginia Historical Society. He is the author of the *Life, Correspondence, and Speeches of Patrick Henry* (3 vols., 1890-91), besides historical addresses and essays.

HENRY AND EM'MA. A poem in dialogue, published in the collected edition of Prior's works in 1709. It is founded on the old English ballad *The Nut-Brown Maid*, and is among the three more ambitious but less read of his attempts. It contains the line: "Fine by degrees, and beautifully less."

HENRY ES'MOND. A novel by Thackeray, published in 1852, and one of the finest historical romances in English. The scene is laid in England in the reign of Queen Anne. The hero is a young colonel in the army, at first deeply in love with the beautiful daughter of his guardian, but finally married to her mother, the widowed Lady Castlewood. See ESMOND, BEATRIX; and CASTLEWOOD, LORD and LADY.

HENRY OF BLOIS, blwä (c.1102-71). An English prelate, son of Stephen, Count of Blois, and brother of Theobald, Count of Blois and Champagne, and of King Stephen. He was brought up at Clugny; came to England in 1126, and, three years later, received the see of Winchester. After the death of Henry I. he did all in his power to gain the crown for Stephen, and at the coronation pledged his word that the liberty of the Church would be kept intact. Henry failed in his candidacy for the see of Canterbury (1136-38), but in 1139 he was appointed Papal legate. As such he opposed the imprisonment of the Bishops of Salisbury and Ely, and, at the Council of Winchester, charged Stephen with sacrilege. In the quarrel between the King and Matilda, he gradually went over to the side of the latter and swore allegiance to her in 1141. But he quarreled with her soon after, and was rescued from her besieging army by the forces of Stephen. In 1143, Pope Innocent II. having died, the commission of Henry expired, Theobald was appointed as his successor, and Henry's power at Rome was over. Five years later he was suspended because of his advice to Stephen that Theobald should not be allowed to attend a Papal council at Rheims. Toward the close of the civil war all Henry's energies were bent on the hastening of peace. He assisted at the coronation of Henry II., but was afterwards under the King's displeasure because of his leaving England without the royal consent (1155). Henry did not fall in with Thomas Becket's policy, and defended the King in 1166 and 1167. He died soon after the death of the Archbishop, for which he bitterly condemned the King.

HENRY OF HUNT'INGDON (c.1084-1155). An English historian, the son of Nicholas, a churchman, who was possibly Archdeacon of Huntingdon. He spent his early years at Lincoln in the home of Bishop Robert Bloet, where Albinus of Angers was his teacher. In 1109 or 1110 he was made Archdeacon of Huntingdon. In 1139 he went to Rome and met Robert de Monte, who made him acquainted with the *Historia Britonum* by Geoffrey of Monmouth. This and a request of Alexander, Bishop of Lincoln, prompted him to write his *Historia Anglorum*, which, in the last edition, came down to 1154. This work is a mere compilation, with occasional touches of pure imagination, for the period to 1127, where the author's personal knowledge begins. The following works are also ascribed to Henry: *Epigrammata Libri VIII.*, of which two books are extant, and one is printed in Wright's *Anglo-Latin Satirical Poets and Epigrammatists of the Twelfth Century* (in the *Rolls Series*, 1872); *De Amore; De Herbis; De Aromatibus;* and *De Lege Domini.* The history is reprinted from Savile, *Scriptores post Bedam* (1596); in Migne, *Patrologia*, vol. cxcv. (1854), and translated by Forester (1853). For his biography, consult Liebermann (Göttingen, 1878).

HENRY OF LAUSANNE, lō'zăn'. See HENRICIANS.

HENRY II. OF TRASTAMARE, trä'stä-mä'rä (?-1379). King of Castile, 1366-67 and 1369-79. He was the oldest son of King Alfonso XI. of Castile by his mistress, Leonora de Guzman. Alfonso gave him the County of Trastamare; but when, in 1350, Peter the Cruel, Henry's half-brother, ascended the throne, Doña Leonora was imprisoned and soon after murdered, while her sons had to flee for their lives. Peter the Cruel continued in his career of assassination until, in 1356, the nobles began a revolt under the leadership of Don Juan de Albuquerque and the illegitimate children of Alfonso. The rebellion was soon suppressed; Henry escaped, while most of the others were executed. In 1360 the Peace of Bretigny between England and France set free bands of marauders who united under the name of Free Companies. Charles V., King of France, in order to rid his country of them, sent them, in 1363, under the leadership of the great general Du Bertrand Guesclin against Peter the Cruel, who was aided by the English under the Black Prince. In 1366 Henry of Trastamare entered Castile, and was crowned as Henry II., and Peter fled to the Black Prince at Bordeaux. By the Treaty of Libourne (April 3, 1366) the English agreed to use their utmost efforts to restore Peter in return for the Lordship of Biscay. They fulfilled their promise, and the Black Prince won the decisive battle of Najera on April 3, 1367, and Henry again became a fugitive. But the departure of the English left Peter defenseless, and in 1369 Henry returned, and was welcomed by Madrid and other cities as far south as Cordova. Peter tried to bribe Du Guesclin to help him to escape, but the latter betrayed him to Henry, who put him to death. The crown was now claimed by Ferdinand of Portugal, and somewhat later by John of Gaunt, who, in 1371, had married Constance, a daughter of Peter the Cruel. But Henry was able to overcome, with French assistance, all attacks, and developed into a good and liberal ruler. Consult Burke, *History of Spain*, vol. i. (London, 1895).

HEN'RYSON, ROBERT (c.1430-c.1500). A Scottish poet. He seems to have been educated abroad, as his name does not appear in the registers of the University of Saint Andrews, the only one existing in Scotland in his youth. When he was admitted, in 1462, to the newly founded University of Glasgow, he was called 'the venerable Master Robert Henrysone, Licentiate in Arts and Bachelor in Decrees.' He probably took orders, and was schoolmaster and notary public at Dunfermline. Henryson, who had the finest poetic talents of all the followers of Chaucer, wrote a sequel to *Troilus and Cressida* entitled the *Testament of Cressida.* He resumes the story where Chaucer leaves off, and completes it by inflicting a suitable punishment on the false Cressida. This continuation displays so much skill that it was included in the earlier editions of Chaucer, as if it had been the work of that poet himself. Another poem, "Robene and Makyne," though short, is remarkable as the first known specimen of pastoral poetry in the Scottish language. Henryson wrote several beautiful lyrics, and made a metrical translation of Æsop, adding morals of his own suitable to his time. In these fables he displays admirable sense

and humor. Consult: the selections in Ward, *English Poets* (London, 1880-83), and *Poems and Fables of Henryson*, edited by Laing (Edinburgh, 1865).

HENRY THE DEACON. See HENRICIANS.

HENRY THE LION (1129-95). Duke of Saxony and Bavaria. He was the son of Duke Henry the Proud. When only ten years of age he lost his father, who had engaged in a war with the Emperor Conrad III. of the House of Hohenstaufen, and who had been stripped of his Bavarian possessions. For seven years the young prince's mother, Gertrude, and his grandmother, Richenza, ruled his paternal dominions in Saxony. In 1146 Henry assumed the reins of government, and at the Diet of Frankfort, in the following year, he demanded of the Emperor Conrad the restoration of the Duchy of Bavaria, which had been wrested from his father. This was refused, and Henry, in concert with his uncle Welf (Guelph), had recourse to arms; but his efforts were crushed by the energetic measures of Conrad. After the death of this Emperor, however, Bavaria was given up to him by his cousin, the Emperor Frederick Barbarossa, who formed with him a close friendship (1156). Henry's possessions now extended (not continuously, however) from the North Sea and the Baltic to the shores of the Adriatic (including some territories in Italy), and he was by far the most powerful prince in the Empire, rivaling in influence the Emperor himself. In 1166 a league comprising the Archbishops of Bremen and Magdeburg, the Bishops of Halberstadt and Hildesheim, the Margrave of Brandenburg, and the Landgrave of Thuringia, was formed against him. He triumphed only after two years of hard fighting. About this time he separated from his first wife, and married Matilda, daughter of Henry II. of England, soon after which event he undertook an expedition to Palestine (1172). Henry broke his alliance with the Emperor by refusing to join in the Italian expedition of 1176, causing Frederick's defeat at Legnano. (See ITALY.) The wrath of the Emperor was kindled, and the numerous enemies of Henry the Lion again combined against him; he was summoned to appear at three different diets, and, refusing, was put under the ban of the Empire in 1180. By 1181 his fortunes were at so low an ebb that he was forced to ask mercy of the Emperor at Erfurt; but all that he could get was permission to retain his hereditary territories of Brunswick and Lüneberg, and even this was on the condition of his going into exile for three years. Henry, in consequence, went with his family to England; but returned to Brunswick in 1185, where he lived quietly. On the departure of Frederick for Palestine in 1189 Henry again was obliged to withdraw to England, but he soon returned, and engaged once more in wars with the petty princes of the North, achieving little, however. A little later he took up arms against the Emperor Henry VI., but was finally reconciled with the Hohenstaufen. He died at Brunswick, August 6, 1195. Consult: Prutz, *Heinrich der Löwe* (Leipzig, 1865); Philippson, *Geschichte Heinrichs des Löwen* (ib., 1867-68).

HENRY THE MINSTREL, or BLIND HARRY. A Scottish poet, who flourished about 1490. Scarcely anything is known of him beyond what is told by John Major in his Latin *History of Scotland* (1521). "When I was a child," he says, "Henry, a man blind from his birth, who lived by telling tales before princes and peers, wrote a book of William Wallace, weaving the common stories (which I, for one, only partly believe) into vernacular poetry, in which he was skilled." In 1490-92 Blind Harry is found at the Court of King James IV., receiving occasional gratuities of 5, 9, and 18 shillings. The poem attributed to him, *The Life of that Noble Champion of Scotland, Sir William Wallace, Knight*, was completed before the end of 1488, when it was copied by John Ramsay. This copy, the oldest manuscript of the work now known to exist, does not ascribe it to Blind Harry, nor is his name given to it in the earlier printed editions. The poem, which contains 11,861 lines, composed in the heroic couplet, is altogether a wonderful performance, for the blind minstrel must have carried it all in his memory. The style is simple and vigorous, and at times eloquent. The author makes repeated appeals to two Latin lives of Wallace, one by his schoolfellow, John Blair, another by Sir Thomas Gray, parson of Liberton. While the poem undoubtedly has a basis in fact, it is to be regarded mainly as a fiction woven out of popular traditions and written in the spirit of the metrical romances, with which the author was well acquainted. The poem was probably printed earlier, but the first extant edition is dated 1570. Immensely popular in Scotland for two hundred years, the poem fell into neglect, owing to the fact that its language naturally ceased to be understood. Its place was supplied in 1722 by the poor modernized version of William Hamilton, of Gilbertfield. Consult: Moir, *A Critical Study of Blind Harry* (Aberdeen, 1888), and a critical edition of the original poem, edited by Moir for the Scottish Text Society (Edinburgh, 1885-87).

HENRY THE NAVIGATOR (1394-1460). A Portuguese prince, celebrated as a munificent patron of voyagers and explorers. He was the fourth son of John I., King of Portugal, and was born at Oporto, March 4, 1394. He first distinguished himself at the conquest of Ceuta, in 1415. As early as 1420 he took up his residence at the town of Sagres, not far from Cape Saint Vincent, and while prosecuting the war against the Moors of Africa exerted himself in every way to decipher the mystery of the great continent upon which the Portuguese had but recently set foot. Under his inspiration Portuguese sailors reached parts of the ocean which the navigators of the time had long supposed to be inaccessible. The grand ambition of Henry was the discovery of unknown regions of the world. At Sagres he founded an observatory, to which he attached a school for the instruction of youthful scions of the nobility in the sciences necessary to navigation. Subsequently he dispatched some of his pupils on voyages of discovery along the western coast of Africa. Creeping down the coast by short and steady stages, these expeditions during Prince Henry's lifetime succeeded in unraveling the unknown shore line of Africa to within fifteen degrees of the equator. The Madeira Islands had been reached in 1419; in 1434 Cape Bojador was discovered; in 1441 Cape Blanco was reached; in 1445 Cape Verde, in Senegambia, was doubled; and in 1455 Cadamosto reached the mouth of the Gambia. Prince Henry died

at Sagres, November 13, 1460; but the impulse which he had imparted to the maritime enterprise of the Portuguese continued for more than fifty years after his death, and resulted in the circumnavigation of Africa, and in the upbuilding of a Portuguese empire in India and in Brazil. The science of navigation, which before his time can hardly be said to have constituted a science at all, is indebted to Prince Henry for many important improvements. Consult: Major, *Life of Prince Henry of Portugal* (London, 1868); id., *Discoveries of Prince Henry the Navigator* (ib., 1877). See AFRICA, section on *History and Exploration*.

HENSCHEL, hĕn'shel, GEORG (1850—). A German-English composer and vocalist, born at Breslau. He was of Polish descent on his father's side, and both his father and mother were noted for their knowledge of music. His first teacher was Schaeffer, and he subsequently studied under Moscheles and Wenzel for the pianoforte, Götz for singing, and Reinecke for theory and composition. He was enrolled as a student in the Liepzig Conservatory from 1867 to 1870, after which he studied in Berlin—composition under Kiel, singing under Schulze, and the violin under Schiever. For the next few years he steadily made a reputation for himself as a vocalist of high rank, singing in the *Messiah* (in French) at Brussels in 1873. Other important engagements followed rapidly, notably in Gluck's *Iphigénie en Tauride*, succeeded in 1874 by an engagement as a soloist at the Lower Rhine Musical Festival held at Cologne. His first concert in England was early in 1877, and his success was so complete that London became his permanent home, and in 1890 he was legally naturalized. He was speedily in request as a teacher of singing, his first English pupil being a daughter of Queen Victoria, the Princess Louise. About this time he first met Miss Lilian Bailey (1860-1901), a young American soprano who made her English début at a Philharmonic Society concert in London in 1879. She became a pupil of his, and two years later (1881) they were married at Boston, Mass. From 1881 to 1884 he was conductor of the Boston Symphony Orchestra, returning to London in 1885. From 1886 to 1888 he was professor of singing at the Royal College of Singing, London. After his marriage his appearances in the principal cities of America were in company with his wife. Both artists became famous for their work in Lieder, although they were equally at home in opera and oratorio. His compositions are many, consisting mainly of vocal works and studies, together with a serious opera, *Nubia* (1899), a comic opera, *A Sea Change* (1899), and several works for string and full orchestra. His most important work is the *Stabat Mater* (1899). He had a very high reputation as a teacher of singing, three-fourths of his pupils generally being Americans. His wife died in London.

HENSEL, hĕn'sel, LUISE (1798-1876). A German devotional poet, sister of Wilhelm Hensel the painter. She was born at Linum, and after the death of her father moved with her mother to Berlin (1810), where, seven years afterwards she met Clemens Brentano, who influenced her greatly. Though she had been a Protestant, she became a Catholic (1818), as Brentano was of that Church. In 1819 she was companion to Princess Salm, and in 1821 became teacher in the family of the Countess Dowager of Stolberg. From 1833 to 1837 she lived in Berlin again; then at Neuberg, Cologne, and Paderborn. In her first book, *Gedichte* (edited by Kletke, 1858), she collaborated with her sister Wilhelmine. Her evening hymn, "Müde bin ich, geh' zur Ruh," is one of the finest of German devotional lyrics. Her completed works were edited by Schlüter (last ed. 1892). Consult Binder, *Luise Hensel* (Freiburg, 1885).—WILHELMINE HENSEL (1802-93), sister of Luise, besides the poems published with Luise, wrote another volume, *Gedichte* (1882).

HENSEL, WILHELM (1794-1861). A German historical and portrait painter, born at Trebbin, Brandenburg. He studied at first architecture in Berlin, then became a pupil of Director Frisch at the Academy, and in 1813-15 took part in the War of Liberation, during which he visited Paris twice and became deeply interested in its art treasures. Although successful afterwards in Berlin as a poet, he yielded to his greater inclination for art, and in 1825 went to Rome, where he copied Raphael's "Transfiguration" and other masterpieces. After his return in 1828 he was made Court painter, and in 1831 professor at, and a member of, the Berlin Academy. He painted mostly biblical subjects, such as "Christ Before Pilate" (1834, Garnisonskirche, Berlin), "Christ and the Woman of Samaria" (Royal Palace, Berlin), "Miriam Leading the Procession of Virgins After Crossing the Red Sea" (1836), etc.; but also historical genre scenes, such as "Vittoria Caldoni Bidding Farewell to Her Friends" (1830), and a great number of portraits —he is credited with more than four hundred— among them those of historical personages ("Emperor Wenceslas," Römersaal, Frankfort) and many contemporaneous celebrities, notably Felix Mendelssohn, whose sister Hensel had married in Rome. He is said to have left also about a thousand portraits in silver point, and did creditable work as an illustrator and etcher, his best-known drawings being those for Tieck's *Genoveva* and *Phantasus*.

HENSELT, hĕn'sĕlt, ADOLF VON (1814-89). A distinguished German pianist, born at Schwabach, Bavaria. The progress he had made in his art, together with the evidences he had given of his genius, led King Ludwig I. to grant him an annuity, which made it possible for him to take up study with Hummel at Weimar and Sechter at Vienna. In 1837 he made his formal début as a concert virtuoso, and scored a remarkable triumph in the several large cities of Germany in which he appeared. The following year he went to Saint Petersburg, where his fame had already preceded him, and where he ultimately reaped his richest rewards. Soon after his arrival there he was appointed Court pianist to the Empress and music-teacher to the Imperial family, an appointment which was followed by that of inspector of musical instruction at the Imperial Educational Institution for Girls. He was not a prolific composer, but all his compositions are marked with his individuality, and depend largely for their interpretation on the style of playing in which Henselt excelled. As a performer he was remarkable for his sympathetic and poetical interpretation, as well as his mastership of legato execution, and what has

since come to be known as singing-touch. His compositions include the well-known F minor pianoforte concerto; *Poème d'Amour*, op. 3; *Ballade*, op. 31; and several other successful pieces, as well as some extremely difficult extension studies for the practice of a legato execution of extended chords and arpeggios. He died at Warmbrunn, Silesia.

HENSEN, hĕn'sen, VICTOR (1835—). A German physiologist, born in Schleswig. He studied medicine at Würzburg, at Berlin, and at Kiel, where he became docent and later professor of physiology. His earlier studies, under the influence of Bernard, were in embryology, and in the physiology and anatomy of the organs of sense; but afterwards he devoted himself to marine biology, became a member of the Commission for Scientific Research in German Waters, and contributed largely to the development of German fisheries. His works include: *Physiologie des Gehörs* and *Physiologie der Zeugung*, both in Hermann's *Handbuch der Physiologie* (1880-81); *Reisebeschreibung der Planktonexpedition* (1892); and *Die Planktonexpedition und Haeckels Darwinismus* (1891).

HEN'SHAW, HENRY WETHERBEE (1850—). An American ornithologist and ethnologist, born at Cambridgeport, Mass. His delicate health drove him from Harvard to bird-collecting in the Southern States. In 1872 he went to Utah, officially employed in the same quest, and he afterwards accepted a Government position at Washington, to write reports upon naturalists' observations, but was transferred in 1879 to the ethnological department. His publications include *Animal Carvings from Mounds of the Mississippi Valley* (1886), and other papers on similar subjects.

HENSLOWE, hĕnz'lô, PHILIP (?-1616). An English theatrical manager. In the neighborhood of Southwark, where he lived, he owned much property, including the Boar's Head and other inns, and managed and partly or entirely owned several playhouses. He rebuilt the new Rose Theatre, managed Newington Butts, the Swan, and, in company with Edward Alleyn, the actor, built the largest London theatre, the Fortune, in Cripplegate (1600). He also carried on a general brokerage business. He bought plays of the authors and sold them to various acting companies. A diary which he kept of these transactions is a most important document. This and other valuable papers are preserved in the library of Dulwich College. The *Diary*, with some forged entries, was published in 1845 by J. P. Collier for the Shakespeare Society. Consult *Catalogue of MSS. of Dulwich College*, edited by G. F. Warner (London, 1881).

HEN'SON, JOSIAH (1787-1883). An American clergyman and lecturer, born a slave in Port Tobacco, Md. His early career is remarkable for the hardships he was forced to endure. He escaped into Canada in 1828, and became a Methodist preacher at Dresden. Mrs. Harriet Beecher Stowe met him, and drew from the story of his life her character of Uncle Tom. Henson lectured throughout the United States, and made three trips to England during the last years of his life. While upon his final tour in 1876 he was entertained at Windsor Castle by Queen Victoria.

HENSTEIN, hĕn'stīn, JOHANNES VON (1822-80). A German botanist, born at Potsdam. He studied horticulture in Potsdam and Berlin, and was made a lecturer in the University of Berlin in 1855. In 1861 he was appointed custodian of the Royal Herbarium, Berlin, and from 1865 was professor of botany and director of the botanical garden at the University of Bonn. His botanical studies were varied, but have to do chiefly with plant physiology and morphology. His publications include: *Untersuchungen über den Bau und die Entwicklung der Baumrinde* (1853); *Versuche über die Leitung des Saftes durch die Rinde* (1860); *Uebersicht des natürlichen Pflanzensystems* (1867); and *Einige Züge aus der Biologie des Protoplasmus* (1880).

HENSZLMANN, hĕn's'l-mân, EMERICH (1813-88). An Hungarian art critic and archæologist, born at Kaschau, and educated at Pest and Vienna. After studying medicine, he devoted himself to archæology and æsthetics, and traveled extensively. He took part in the Revolution of 1848, serving in a department of the Ministry of Foreign Affairs. He was imprisoned for eight months; then left Hungary and lived in London and Paris until 1862, when he returned to his home. He was a member of the Lower House of the Hungarian Diet (1869-72), and professor of the history of art at Budapest (1873-88). A member of the Hungarian Academy and of the National Kisfaludy Society, he wrote: *Théorie des proportions appliquées dans l'architecture* (1860); *Die nordfranzösische Abtei und Kathedralkirche* (1865); *Die Grabungen des Erzbischofs von Kalocsa* (1873); and, in Hungarian, on the relation between Greek tragedy and Christian drama (1846), on mediæval architecture (1866), and on the remains of Gothic architecture in Hungary (1880).

HEN'TY, GEORGE ALFRED (1832-1902). An English author. He was born at Trumpington, Cambridgeshire, and was educated at the Westminster School and at Caius College, Cambridge. He served in the purveyor's department of the British Army during the early part of the Crimean War, and after returning home invalided was promoted to be purveyor and given service in the Italian Legion. After the close of the war he commanded for a time the Belfast and Portsmouth districts, and in 1866 became war correspondent of the London *Standard*. In the service of his paper he accompanied the contestants of the Austro-Italian, Turco-Servian, and Franco-Prussian wars; took part in the Abyssinian expedition of 1868 and the Ashanti expedition of 1873; participated in Garibaldi's Tyrolean campaigns; was present at the opening of the Suez Canal in 1869; attended the Prince of Wales during his travels through India; and made an extended tour of the mining regions of the United States. He is known as the most prolific and popular of contemporary writers for boys, his books being chiefly historical novels. The best known of his novels are: *All But Lost* (1869); *Gabriel Allen* (1888); *Dorothy's Double*; *A Woman of the Commune*; and *Colonel Thorndyke's Secret* (1898). Among the most recent of his books for boys are: *In the Irish Brigade* (1900); *Out with Garibaldi* (1900); *With Buller in Natal* (1900); *At the Point of the Bayonet* (1901); *Malcolm the Water-Boy* (1901); *To Herat and Cabul* (1901); *With Roberts to Pretoria* (1901); *The Treasure of the*

Incas (1902); *With the British Legion* (1902); *With Kitchener in the Soudan* (1902).

HENTZ, NICOLAS (1750-1820). A French politician, born at Sierck, where he became justice. Elected to the Convention in 1792, he voted for the death of the King, and became a trusted agent of the Revolution. In 1794, when he returned to Paris from a long series of important missions, in which he had had unlimited powers, he was accused of cruelty in La Vendée, and was found guilty; but, benefiting by the amnesty of October, he left public life. The law against the regicides passed in 1816 forced him to leave the country. He escaped to the United States, and died on an island in Lake Erie.

HENZÉ, äN'zâ', GUSTAV (1815—). A French agriculturist, born in Paris. He was educated at the Agricultural Institute of Grignon, and was appointed director of the Grand-Jouan Institute in 1840. Six years afterwards he was administrator of the school at Nozay, then professor of agriculture at Grignon, and was appointed to the same chair at the opening of the Institute in Paris, and in 1880 was made also inspector-general of agriculture. Between 1843 and 1849 he wrote voluminously upon professional subjects, such as fodder, fertilizers, milk, pastures, and the *Influence of the Crusades upon the Agriculture of the Middle Ages* (1855).

HENZEN, hĕn'tsen, JOHANN HEINRICH WILHELM (1816-87). A German philologist and authority on Latin inscriptions. He was born at Bremen, studied at Bonn, Berlin, and, after travels through France, England, Italy, and Greece, at Rome, where from 1842 to the end of his life he was closely associated with the German Archæological Institute. With Mommsen and De Rossi he edited for the Berlin Academy that great work *Corpus Inscriptionum Latinarum*, in which he personally edited the *Fasti Consulares* to 766 A. U. C. and the inscriptions of the city of Rome after Cæsar. His other works, besides many contributions to philological journals, to the *Bulletino* and the *Annali* of the archæological institutes and *Ephemeris Epigraphica*, were a supplementary volume to Orelli's *Inscriptionum Latinarum Collectio* (1856), and *Acta Fratrum Arvalium quæ Supersunt* (1874).

HENZEN, WILHELM (1850—). A German dramatist, born in Bremen, and educated at Leipzig, where, save for two years (1874-75) at Munich, he lived after the success of his first play, *Die Kypseliden* (1874). Henzen was connected with the Stadttheater as dramaturgist from 1882 to 1885, and in 1893 became director of the National Association of Dramatic Authors and Composers. Besides the dramas: *Lügen des Herzens* (1876); *Ossian* (1877); *Zweideutigkeiten* (1878); *Studiosus Lessing* (1880); *Bettina de Monk* (1881); *Luther* (1883); *Ulrich von Hutten* (1884); *Schiller und Lotte* (1891); *Tod des Tiberius* (1895); and *Kaiser, König und Bürger* (1890), and others, he wrote the valuable study, *Ueber die Träume in der altnordischen Sagalitteratur* (1885-89).

HENZI, or **HENTZI,** hĕn'tsê, SAMUEL (1701-49). A Swiss patriot, born at Bümplitz (Canton of Bern). After a very comprehensive training he held subordinate posts under the Government of the Canton of Bern; in 1741 was appointed a captain in the military service of the Duke of Modena; and in 1744 with others addressed to the Council of Bern a petition for a revision of the Constitution. For this he was sentenced to ten years' banishment, commuted by pardon in 1748. While an assistant librarian at Bern he entered into a conspiracy which had for its object the subversion of the Constitution, but which he supposed intended merely a second petition to the cantonal authorities. The undertaking was, however, discovered, and Henzi was executed on July 17, 1749, with two associates. Lessing planned a tragedy based on the fate of Henzi. Consult Bäbler, *Samuel Henzi's Leben und Schriften* (Aarau, 1880).

HE'PAR (Lat., from Gk. ἧπαρ, liver). A name given by the older chemists to brown or liver-colored compounds of sulphur. *Hepar antimonii*, called also 'liver of antimony,' is a mixture of antimony trioxide, potassium sulphide, potassium carbonate, and antimony trisulphide, which has been used in veterinary medicine. *Hepar sulphuris*, called also 'liver of sulphur,' is a mixture of potassium hyposulphite, potassium sulphide, and potassium pentasulphide, with some potassium carbonate, which has also been used in medicine.

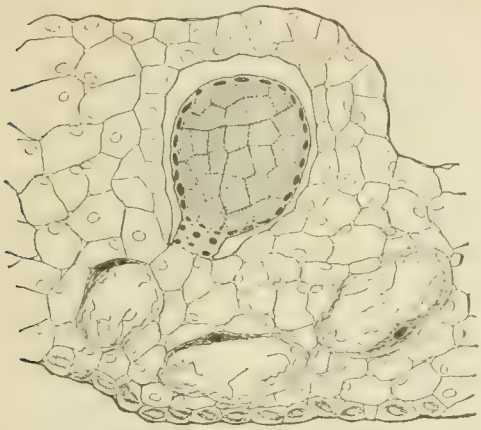
HEPAT'ICA, LIVERLEAF (Neo-Lat., from Lat. *hepaticus*, Gk. ἡπατικός, *hēpatikos*, relating to the liver, from ἧπαρ, *hēpar*, liver). A plant of the genus Anemone, which belongs to the natural order Ranunculaceæ. The best-known species, *Anemone hepatica*, has showy white, pink, or blue flowers that in earliest spring emerge from a hairy bud which is surrounded by the sombre-

HEPATICA.

tinted leaves of the previous year. It is the most beautiful of the early spring flowers of Eastern America, and one which by reason of its habitat and mode of blooming furnishes many texts for nature-study in elementary schools. The same species is found throughout Northern Europe, where it is cultivated and often produces double flowers. The root has powerful astringent properties. Another species, *Anemone angulosa*, native in Transylvania, is cultivated for the sake of its beautiful pale-blue flowers.

HEPAT'ICÆ (Neo-Lat. nom. pl., from Lat. *hepaticus*, pertaining to the liver). The technical name of the group of plants popularly known as liverworts. The Hepaticæ form one of the two primary subdivisions of bryophytes; the other one includes the mosses. Liverworts grow in a variety of conditions; some float on the water; many live in damp places, and many on the bark of trees, but in general they are moisture-loving plants. The prostrate body consists of what is

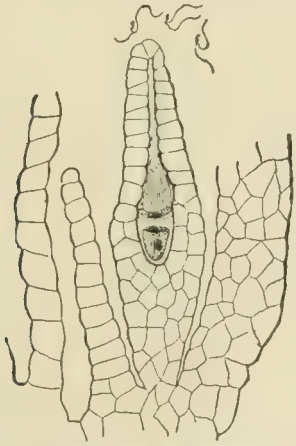
called a 'thallus' (q.v.). By virtue of this position the body is 'dorsiventral,' since the two surfaces are unlike. The upper (dorsal) surface, exposed to the light, develops structures accordingly; while the under (ventral) surface



IMBEDDED ANTHERIDIUM OF ANTHOCEROS.

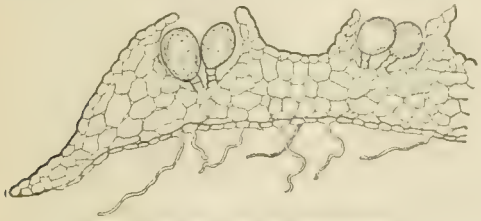
is against the substratum and develops root-like processes as hold-fasts and absorbing organs.

There are three well-defined groups of liver-



ARCHEGONIUM OF PORELLA.
With three sperms approaching the neck.

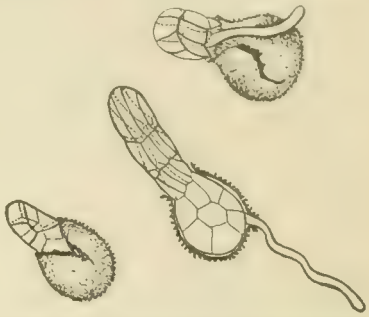
worts, each of which represents a special line of development. In the *Marchantiales*, the thallus body remains simple in form, like a flat green



SECTION OF THALLUS OF ANTHOCEROS.
Showing antheridia in pits.

disk, but becomes thick and rather complex in structure. This thickish body not only produces root-like processes (rhizoids) from its under surface, but develops reproductive structures from its upper surface. In many cases there is a budding form of reproduction; little cups (cupules) appear often in great numbers in which small disk-like bodies (gemmæ) are formed. When these gemmæ are scattered they again produce new plants. Upon the upper surface also the sex organs are carried, and in Marchantia itself they are borne upon the summit of a conspicuous erect branch. As a rule the two sex organs (antheridia and archegonia) are borne upon different plants.

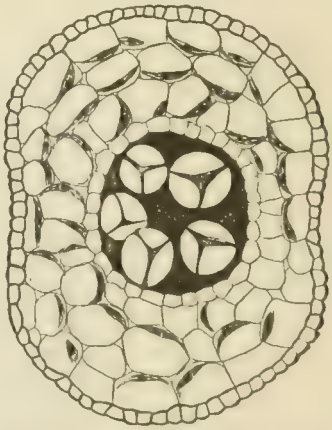
The *Jungermanniales* include many more species than either of the others. These forms often



GERMINATION OF SPORES OF CONOCEPHALUS.

grow in very dry situations, as on rocks, tree-trunks, etc., and are often mistaken for delicate mosses. Their resemblance to mosses suggests one of the chief features. The prostrate thallus body remains simple in structure, but becomes very much modified in form, being organized into a central stem-like axis which bears two rows of small foliage leaves. As a consequence the Jungermanniales are usually spoken of as the 'leafy liverworts.'

The *Anthocerotales* comprise comparatively few forms, but these are of great interest since they are supposed to represent forms which have given rise to the mosses and perhaps to the ferns

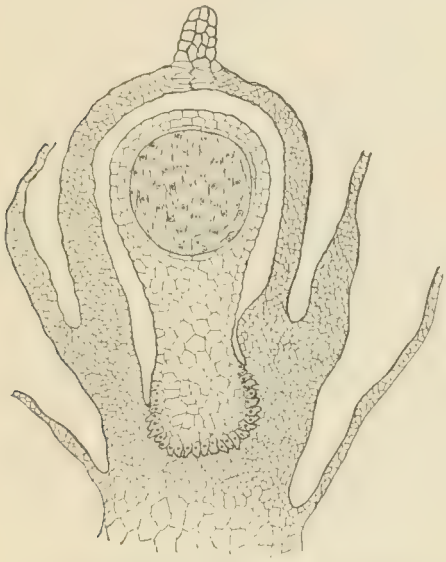


CROSS-SECTION OF SPOROGONIUM OF ANTHOCEROS.
Showing spores within, and surrounded by heavy green tissue.

also. The thallus body is very simple, both in structure and in form, but the chief interest is in connection with the spore-case, which is elon-

gated like a slender pea-pod, grows continuously in length, is green, and splits into two valves.

The liverworts are thought to have been derived from certain green algæ, and among them there is the first clear example of alternation of generations (q.v.). The thallus body is the sexual generation (gametophyte, q.v.), since it bears the sex organs. The fertilized egg produced by these sex organs develops a very different body, namely the spore-case, which is the sexless generation (sporophyte, q.v.). The spores upon germination produce the thallus body or gametophyte again, and so the alternation continues. The structure of the sex organs is also of interest, since they are very different from those of the algæ from which the group has come. The male organ (antheridium, q.v.), a many-celled body, consists of a wall of sterile cells within which very numerous sperm-producing cells occur. These sperms, which are of definite structure, have just two motile cilia.



VERTICAL SECTION OF SPOROGONIUM OF PORELLA, still within the calyptra, and showing the globular spore region.

The female organ (archegonium, q.v.), which is very characteristic, is a flask-shaped body, within the bulbous base of which a single large egg is formed. How this archegonium of the liverworts has been derived from the far simpler female organs of algæ is one of the important botanical problems. In any event, it continues to be the characteristic female organ through mosses, ferns, and gymnosperms. (See CHLOROPHYCEÆ.) Fossil liverworts, allied to the modern genus Marchantia, are found rarely in the Eocene shales and in the Oligocene amber of Europe. See plate of BRYOPHYTES.

HEP'ATI'TIS (Neo-Lat., from Gk. ἧπαρ, *hēpar*, liver). Inflammation of the liver. See LIVER, DISEASES OF.

HEP'BURN, JAMES. See BOTHWELL, JAMES HEPBURN, EARL OF.

HEPBURN, JAMES CURTIS (1815—). An American medical missionary and scholar; born at Milton, Pa. He was educated at the College of New Jersey (now Princeton University), where he graduated in 1832. He studied medicine in the Medical Department of the University of Pennsylvania, and received his degree of M.D. in 1836. In 1840 he offered his services as a medical missionary to the Presbyterian Board of Foreign Missions, and in the following year he sailed with his wife for Siam. His destination was afterwards changed to China, five new ports having been opened there by the treaty of 1842. He arrived at Amoy, one of the newly opened ports, in 1843, and labored in that field until 1846, when, on account of impaired health, he resigned and returned to New York City. Here he was a successful practitioner until the opening of Japan in 1859, when he again volunteered for service. In that year he went to Yokohama and engaged in such medical and evangelistic work as could then be carried on in view of the hostile attitude of the Government to Christianity. He mastered the language, and in 1867 brought out his Japanese-English and English-Japanese Dictionary, a work of great learning which has remained the standard dictionary until the present day. In 1873 an abridged edition was published in New York. Dr. Hepburn took a leading part in the translation of the Scriptures into Japanese. His medical work included the training of many young Japanese as physicians. In 1892 he published a valuable *Dictionary of the Bible* in Japanese, and in the same year retired, and made his home in East Orange, N. J.

HEPBURN, Sir JOHN (c.1598-1636). A Scotch soldier of fortune, born at Athelstaneford, and probably educated at Saint Leonard's College, Saint Andrews. He fought under Gray in Bohemia (1620); and under Mansfeldt in Holland (1622). Subsequently he served in the army of Gustavus Adolphus, and entered the French Army in 1633. After two years of brilliant fighting in Lorraine, and at the sieges of Hagenau and Saverne, he was killed. He was a Catholic and a prime favorite with Richelieu.

HEPHÆSTION, hē-fĕs'tĭ-ŏn (Lat., from Gk. Ἡφαιστίων, *Hephaistiōn*) (c.357-324 B.C.). A Macedonian courtier, known as the friend of Alexander the Great. The two are said to have been companions in childhood; but further than this we do not hear of Hephæstion till B.C. 334, when Alexander visited Troy. Hephæstion is there said to have performed the same service at the grave of Patroclus as Alexander performed at that of Achilles. After that time the two were close friends. In his campaigns Alexander often gave Hephæstion important commissions, and he rewarded him with a golden crown and the hand of Drypetis, daughter of Darius and sister to his own wife, Statira. When, in B.C. 324, Hephæstion died at Ecbatana, the grief of Alexander was extravagant. He sent to inquire of Jupiter Ammon how he should honor his dead friend, and was told to offer sacrifice to him as a hero. The funeral was one of the grandest recorded in history. A funeral pyre was erected at Babylon at a cost of over 10,000 talents, and temples were built in honor of Hephæstion in many places.

HEPHÆSTION. An Alexandrian grammarian of the second century A.D., tutor to the Emperor Verus. He was the author of a work on prosody in forty-eight books, of which he himself made several abridgments. The manual on metres entitled Ἐγχείριδιον περὶ μέτρων (*En-*

cheiridion peri metrōn), which is still extant, is supposed to have been his final abridgment. Though it gives merely a bare sketch of prosody, without any theoretical explanation of the facts, it is of great value; it is the only treatise on Greek prosody preserved complete from antiquity, and contains quotations from many lost poets. An incomplete treatise on the different forms of poetry and composition is appended to it. The manual has been edited by Gaisford (Oxford, 1810) and by Westphal in his *Scriptores Metrici Græci* (Leipzig, 1866).

HEPHÆSTUS, hê-fēs'tŭs. See VULCAN.

HEP'TAGON (from Gk. ἑπτάγωνος, *heptagōnos*, seven-cornered, from ἑπτά, *hepta*, seven + γωνία, *gōnia*, angle). A plane geometric figure of seven sides. It has especial interest because the regular heptagon cannot be constructed by elementary geometry. See POLYGON.

HEPTAM'ERON (Gk. ἑπταήμερον, *heptaēmeron*, from ἑπτά, *hepta*, seven + ἡμέρα, *hēmera*, day). The name of a collection of tales made by several writers at the Court of Marguerite de Valois. Le Maçon, at the Queen's behest, translated Boccaccio's *Decameron* in 1445. The *Decameron* inspired the form and other elements of the *Heptameron*. The ten story-tellers of Boccaccio fled from pest-stricken Florence to a beautiful villa, where ten stories are told every day for ten days. In the *Heptameron* five elegant men and women, being caught by a storm at the foot of the Pyrenees, determine to while away the time by having each of the company tell a story every day for ten days. But Marguerite left only seven days and two stories of the eighth day. The *Joyeux Deviz* of Bonaventure des Périers continues the tradition of the old French *fabliaux* and farces, whereas the *Heptameron*, as has been shown, is Italian in genesis and in tone. The body of the work is, like the old *fabliaux*, cynical and often licentious; but the *Heptameron* shows more feeling for natural beauty, and there is an occasional touch of altruistic devotion and even of lyric passion. Thus the *Heptameron* introduces into French fiction an element of emotional psychology. It makes of a story designed to amuse an instrument of observation and a method of description of human passion. It transfers the interest, rarely and tentatively, yet really, from act to motive—bearing witness to the keener psychology that resulted from the Protestant training in controversial dialectics, universal in the Court circle of Marguerite, to whom the editing at least of the *Heptameron* is to be attributed. The *Heptameron* was first published in 1558. There are many later editions of textual accuracy, and there is a partial and unfaithful English version.

HEPTAN'OMIS. A name given by the Greeks to the interior of Egypt from 30° to 27° N., which comprised nearly all the greatest Egyptian cities and monuments.

HEP'TARCHY (from Gk. ἑπτά, *hepta*, seven + ἀρχή, *archē*, kingdom, from ἄρχειν, *archein*, to rule). The name formerly given to the kingdoms established by the Angles and Saxons in England. It was believed that there were seven kingdoms, which were contemporaneous and well established, but all that can be safely asserted is that England before the beginning of the ninth century was peopled by various tribes, which were constantly at war with each other, and that sometimes one tribe was conquered, and sometimes another. At no time was there a counterpoise of power among seven of them, so that they could be said to have a separate, much less an independent, existence. Still, seven names do survive. Occasionally the King who was most powerful for the time being was styled Bretwalda, but in most instances the power of this supposed ruler, beyond the limits of his own territory, must have been very small. The hegemony among the Saxon States generally rested with one of the three great frontier kingdoms, Northumbria, Mercia, and Wessex. The supremacy of Northumbria was established by Edwin (q.v.), who fell in battle against Penda, King of Mercia, in 633. Under Egbert (802-39) Wessex rose to be supreme, and virtually swallowed up the others. The following are the seven kingdoms commonly said to have formed the heptarchy: Kent, Sussex, Wessex, Essex, Northumbria, East Anglia, and Mercia. Consult: Ramsay, *The Foundations of England*, vol. i. (London, 1898); Green, *The Making of England* (London and New York, 1881). See ANGLO-SAXONS; also the articles under the seven names mentioned.

HEP'TASOPHS, IMPROVED ORDER OF. A fraternal association in the United States, organized in 1878, as an offshoot from the Order of Heptasophs (q.v.), from which it differed by the adoption of death benefits as one of its features. The ritual, governing principles, conditions of membership, and methods of business are identical with the original order. At the close of 1902 the order had 722 conclaves, representing a membership of 52,825; had paid during the last fiscal year $944,615 in death benefits, and claimed to have disbursed since its organization the sum of $6,970,010.

HEPTASOPHS, ORDER OF. A benevolent fraternal order in the United States, founded in New Orleans in April, 1852, by Alexander Leonard Saunders and several prominent Free Masons. It was originally called the order of "Seven Wise Men," but the title was later changed to the Greek form. The ritual is very elaborate, and much significance is attached to the number seven, the membership in each chapter being either seven or a multiple of that number. After 1872 the adoption of a death benefit system was agitated, but aroused great opposition, leading in 1878 to the secession of the Zeta Conclave of Baltimore, which organized the Improved Order of Heptasophs. (See HEPTASOPHS, IMPROVED ORDER OF.) In 1880 the order finally adopted the benefit feature. Membership is confined exclusively to white male persons, and a belief in the existence of a Supreme Being is required. In 1891 the membership in 18 States was about 4000.

HEPTATEUCH, hĕp'tȧ-tūk (from Gk. ἑπτά, *hepta*, seven + τεῦχος, *teuchos*, tool, book). A word formed on the analogy of Pentateuch, meaning the first seven books of the Bible. It is applied particularly to an abridgment and translation of these books, with the Book of Job, into Anglo-Saxon, made by Ælfric the Grammarian (q.v.) in the tenth century. There are copies of it in the British Museum and the Bodleian Library. It was first printed in 1698 by Edward Thwaites.

HEPWORTH, George Hughes (1833-1902). An American clergyman and journalist. He was born in Boston, graduated at Harvard Divinity School in 1855, and entered the Unitarian ministry at Nantucket, Mass. He was pastor of the Church of the Unity, Boston, from 1858 to 1870, meantime serving as a chaplain in the Union Army on the staff of General Banks. In 1870 he took charge of the Church of the Messiah in New York, but resigned within two years, renouncing the Unitarian faith, and soon afterwards established in the same city the Church of the Disciples. He resigned this charge in 1878, and went abroad for rest. He preached at the Belleville Avenue Congregational Church in Newark, N. J., from 1882 until 1885, when he became connected editorially with the New York *Herald* and *Evening Telegram*. He had charge of a famine relief fund for Ireland in 1880, and later investigated the condition of the Armenian Christians. Among his writings are: *Whip, Hoe, and Sword* (1864); *Rocks and Shoals* (1870); *Hiram Golf's Religion* (1892); *Brown Studies* (1895); *The Farmer and the Lord* (1896); and *Through Armenia on Horseback* (1898).

HE'RA. See Juno.

HERACLEA, hĕr'ā-klē'a (Lat., from Gk. Ἡράκλεια, *Hērakleia*, from Ἡρακλῆς, *Hēraklēs*, Hercules). The name of a number of Greek towns, in both Europe and Asia. Of these the most important were: (1) Heraclea in Lucania, near the Gulf of Tarentum, not far from the modern Policoro. It was founded in B.C. 432 by Tarentines and Thurians, and the inhabitants of the earlier colony Siris, which continued to exist only as its port. In a fertile territory it seems to have enjoyed great prosperity, but in dependence upon Tarentum. In B.C. 280 the first great battle between Pyrrhus (q.v.) and the Romans was fought near by, and two years later the Romans concluded with Heraclea a treaty of alliance on very favorable terms. It was still a flourishing place in the time of Cicero, but later fell into decay, and is now a heap of ruins. Near the ancient site were found in 1732 and later two bronze tablets, the *Tabulæ Heracleenses*, containing on one side a long Greek inscription of the fourth century B.C. relating to certain sacred lands of Dionysus and Athena, whose boundaries had been disturbed in a recent war, and on the other a much more important Latin document, the *Lex Iulia Municipalis* (B.C. 45), which is one of the chief authorities for the municipal law of Italy. These inscriptions have often been published, but may best be found in Kaibel, *Inscriptiones Græcæ, Siciliæ et Italiæ*, 645 (Berlin, 1890), and *Corpus Inscriptionum Latinarum*, i. (Berlin, 1863).

(2) Heraclea Minoa, on the south coast of Sicily, east of Agrigentum. The city seems to have been originally a Phœnician trading station, Rus Melkart, but was later occupied by Selinus, and about B.C. 510 by Spartans under the leadership of Euryleon. The name Minoa was due to a legend attributing the founding of the city to Minos of Crete. It was afterwards destroyed by the Carthaginians, though a small settlement continued to exist under Carthaginian rule, and after B.C. 314 rose to renewed importance, and was one of the chief Carthaginian naval stations during the First Punic War. The site, on Cape Bianco, is now wholly deserted, and but few traces of the ancient city are visible.

(3) Heraclea Pontica, a Megarian colony on the south coast of the Black Sea, the modern *Eregli* (q.v.). It seems to have been founded about the middle of the sixth century B.C., and after a period of party strife, passed under the rule of a moderate oligarchy, which soon made it master of the neighboring territory including some of the lesser Greek colonies. Even when the aristocracy was supplanted by a tyrant, the prosperity of the city continued to increase; but after the overthrow of the Persian Empire by Alexander the growth of the Bithynian power and the wars with the Galatians lessened its influence. It was plundered by the Romans in the Mithradatic war, and from that time gradually declined. It was the birthplace of the philosopher Heraclides Ponticus (q.v.).

HER'ACLE'ON (Lat., from Gk. Ἡρακλέων, *Hērakleōn*). A Gnostic Christian, who flourished in Italy during the third quarter of the second century. Clement of Alexandria calls him the most distinguished follower of Valentinus (q.v.). His writings survive only in fragments, and each quotation is accompanied by unfriendly comments by his orthodox opponent. He wrote a Gospel commentary, entitled *Hypomnemata*, which dealt especially with Saint John. Origen preserves considerable fragments of this work in his own commentary on the same Gospel. Clement also quotes from Heracleon, but we are not certain that it is from this work. Hippolytus says that Heracleon and other Western Valentinians taught that Christ's body was of animal substance, while the Oriental School regarded it as spiritual. But we know little about the details of their systems. Heracleon's influence was sufficient to perpetuate his name among his followers, who are called Heracleonites. Consult Brooke, *The Fragments of Heracleon* (Cambridge, 1901). See Gnosticism.

HER'ACLE'ONAS (Lat., from Gk. Ἡρακλειωνας, *Hērakleiōnas*) (c. 614-?). An Emperor of Byzantium, son of the Emperor Heraclius. He fought with his father in Syria, and was appointed Cæsar in 638 or 639. When his father died (641) his mother, Martina, asked that he be permitted to rule with his invalid stepbrother, Constantine III. But Constantine died after a reign of less than five months and Heracleonas became sole Emperor. The Senate suspected that Martina had had this in view and had possibly hurried the death of her stepson; a revolution broke out; Heracleonas was dethroned, his nose cut off, his mother's tongue torn out, and the two were exiled to Constantinople. Constans II., son of Constantine, succeeded to the throne.

HERAC'LEONITES. See Heracleon.

HERAC'LEOP'OLIS (Lat., from Gk. Ἡρακλέους πολις, *Hērakleous polis*, city of Hercules). A city of ancient Egypt on the right bank of the Bahr Yûsuf (Joseph's Canal), about 10 miles west of the Nile. It was called by the Egyptians *Henen-suten*, whence its Coptic name *Hnês*, and its modern Arabic name *Ahnas* and *Henassîye*. Heracleopolis was the seat of worship of the ram-headed god Hershef, whom the Greeks identified with Heracles. Of the temples and other buildings, for which the place was renowned in ancient times, scarcely anything remains. An extensive necropolis lies upon the opposite bank of

the Bahr Yûsuf. Consult Naville, *Ahnas el Medineh*, Egyptian Exploration Fund, vol. xi. (London, 1891).

HER'ACLES. See HERCULES.

HERACLEUM, hĕr'ā-klē'ŭm. See COW-PARSNIP.

HER'ACLI'AN (A.D. ?-413). A Roman general. At the instance of the Emperor Honorius, he put Stilicho to death (A.D. 408), and received the Government of Africa as his reward. After supporting the Emperor during the invasion of Alaric and the usurpation of Attalus, whom Alaric had made Emperor, Heraclian revolted and invaded Italy. His enterprise failed, however, and on his return to Carthage he was put to death by order of Honorius.

HERACLIDÆ, hĕr'ā-klī'dē (Lat., from Gk. Ἡρακλεῖδαι, *Hērakleidai*, descendants of Hercules, from Ἡρακλῆς, *Hēraklēs*, Hercules). (1) The name is applied specifically to those legendary descendants who were said to have led the Dorians in the conquest of the Peloponnesus. The legend told of an unsuccessful attempt by Hyllus, son of Heracles, to recover the inheritance from which Eurystheus had driven him, and then, 100 years later, of the successful invasion, led by his great-grandsons Temenus, Cresphontes, and Aristodemus, sons of Aristomachus. They defeated Tisamenus, son of Orestes and grandson of Agamemnon, and gained possession of the Peloponnesus. Argos fell to Temenus; Lacedæmon to Procles and Eurystheus, the sons of Aristodemus; Messenia to Cresphontes; Elis to the Ætolian Oxylus; Arcadia alone remained undisturbed. This story of the return of the Heraclidæ seems to owe its development to the epic, rather than to popular tradition, and is an attempt to explain the change from the conditions of the Homeric poems to those of the period after the Dorian conquest. The poems of Tyrtæus show its general acceptance in Sparta about B.C. 650. It is the later legendary account of the Dorian conquest, which from its nature must in reality have been a much more obstinate and protracted struggle. Consult the histories of Greece by Thirlwall, Grote (older views), Holm, and Busolt, and especially Meyer, *Geschichte des Altertums*, ii. (Stuttgart, 1893).

(2) A tragedy by Euripides, brought out about B.C. 420. It tells of the persecution of the sons of the dead Heracles by Eurystheus and their reception and protection by Athens. The children of Heracles, under the leadership of Iolaus, come to Marathon, and the Athenians gain a victory over the Argives through the voluntary sacrifice of Macaria, daughter of Heracles. Eurystheus is taken prisoner and surrendered to Alcmene, who demands his death. The play was meant to represent to Sparta how unnatural her contemplated alliance with Argos during the Peloponnesian War would be, and was directed against the Argive party in Athens.

HER'ACLI'DES PONTICUS (Lat., from Gk. Ἡρακλείδης, *Hērakleidēs*, and *Pontus*). A Greek philosopher of the fourth century B.C., born at Heraclea in Pontus. At Athens he became a disciple of Plato, whom he represented during the latter's absence in Sicily. Later, however, he attached himself to Aristotle. His numerous writings covered many fields, including philosophy, grammar, music, physics, rhetoric, political and literary history, and geography. Critical and philosophical ability were apparently not possessed by him in a high degree, for his philosophical works were early neglected. His biographical and grammatical treatises, however, enjoyed a long popularity. Diogenes Laërtius praises his style, while Cicero blames him for his fondness for marvelous tales. The extracts, *On Constitutions*, which bear the name of Heraclides, are only a poor compilation from Aristotle's *Politics*, and should be attributed to Heraclides Lembos (second century A.D.). This work was edited by Schneidewin (Göttingen, 1847), and by Kaibel and Wilamowitz, as an appendix to their edition of Aristotle's *Constitution of Athens* (Berlin, 1898). The fragments of Heraclides's writings were collected by Müller, *Fragmenta Historicorum Græcorum*, vol. ii. (Paris, 1848). Consult: Voss, *De Heraclidis Pontici Vita et Scriptis* (Leipzig, 1896); and Schmidt, *De Heraclidæ Pontici et Dicæarchi Messenii Dialogis Deperditis* (Breslau, 1867).

HER'ACLI'TUS (Lat., from Gk. Ἡράκλειτος, *Hērakleitos*). A Greek philosopher who flourished about B.C. 500, born at Ephesus in Asia Minor. From the obscurity of his writings he was nicknamed 'The Dark' (ὁ σκοτεινός). Only one work, that *On Nature*, can be attributed to him. Of this, numerous fragments are preserved by later writers. Heraclitus's philosophy was a development of the Ionic doctrine under the influence of Xenophanes. The principle of all things according to him was fire, a self-determined ether, which by condensation and rarefaction creates the phenomena of the sensible world. To the 'being' of his predecessors he added the principle of 'becoming.' He held that all things are in constant flux, and that the appearance of stability is due to the uniformity of motion. His philosophy had a strong influence on later thinkers; Zeno recalled it, and Stoicism was based on its teaching. The fragments of his work are to be found in Mullach, *Fragmenta Philosophorum Græcorum*, vol. i. (Paris, 1860); Ritter and Preller, *Historia Philosophiæ Græcæ* (7th ed., Gotha, 1888). Consult: Zeller, *Philosophie der Griechen* (5th ed., vol. i., Leipzig, 1892); Patrick, *The Fragments of the Work of Heraclitus* (Baltimore, 1889).

HERACLIUS, hĕr-ā-klī'ŭs (c.575-641). Byzantine Emperor from 610 to 641. He was a native of Cappadocia and belonged to a distinguished family, his father having been Exarch of Africa. In 610, when the tyranny of the Emperor Phocas had become unbearable, and the mother and bride to be of Heraclius himself were imprisoned, he equipped a fleet in Africa, and appeared before Constantinople. The citizens rose in rebellion, Phocas was beheaded, and Heraclius became Emperor in his stead. The condition of the Byzantine Empire at this time was deplorable. Years elapsed before Heraclius could put forth any vigorous efforts for its reorganization. In 619 the Avars plundered the country to the gates of Constantinople and carried off an immense number of captives. In the East, the conquests of the Persians threatened the very existence of the Empire. Jerusalem was stormed by the generals of Khosru in 615 and Egypt was overrun in the following year. The stopping of the export of corn from Egypt to Constantinople caused a severe famine in the capital. The Emperor, however, was meanwhile disciplining and

equipping an army for the invasion of Persia, and in 622 he took the field. In the plain of Issus he routed a Persian army and forced his way through the passes of the Taurus and Anti-Taurus, into the ancient Pontus, where his soldiers wintered. In 624 he crossed Armenia, conquered several of the Perso-Caucasian countries, and reached the Caspian Sea. There he formed an alliance with the Khazars, and with their assistance attacked Media, and carried his arms as far south as Ispahan. Before going into winter quarters, he defeated the main body of the Persians, commanded by Khosru himself. In 625 Heraclius descended from the Caucasus into Mesopotamia, and thence proceeded into Cilicia, where he routed the Persians once more with immense slaughter. During the next two years (626-628) Heraclius carried the war into the heart of the Persian Empire, and in December, 627, cut to pieces the forces of Rhazates, the Persian general, near the junction of the Little Zab and the Tigris. An immense booty fell into the hands of the victors. Khosru fled into the interior of Persia, and was soon afterwards put to death by his son Siroes, who concluded a peace with Heraclius, by which the Persians gave up all their former conquests (628). Not the least of the trophies Heraclius brought back to Constantinople was the alleged wood of the true cross, which the Persians had carried off from Jerusalem in 615. The fame of Heraclius was now at its height, but the rise of the Mohammedan power in Arabia brought a new and terrible enemy against the old Empire, where religious dissensions still created bitter factions, whose strife weakened the State. Heraclius seems to have exhausted his splendid energies and ambition in the remarkable Persian campaigns, and now spent his time in his palace at Constantinople, partly in sensual pleasures, and partly in theological disputations. In his efforts to mediate between the orthodox party and the monophysites (q.v.) Heraclius sought to impose the monothelite doctrine on the Empire, arousing thereby great disturbances in the capital. (See MONOTHELITISM.) Before the close of his life, Syria, Palestine, Mesopotamia, and Egypt were in the hands of the caliphs. He died February 11, 641. Consult: Bury, *A History of the Later Roman Empire from Arcadius to Irene*, vol. ii. (London, 1889); Finlay, *History of Greece* (London, 1877); Gibbon, *Decline and Fall of the Roman Empire*, ed. Bury (London, 1896-1900); Drapeyron, *L'empereur Heraclius et l'empire byzantin au VIIème siècle* (Paris, 1869), with bibliographical notes. There is also a contemporary account by Sepeos, an Armenian bishop, that was published in Constantinople in 1850. See BYZANTINE EMPIRE.

HÉRACLIUS, â'rȧ'klê-ụs'. A minor tragedy by Corneille (1647). The play is exceedingly complicated in plot, and contains few passages of great excellence.

HERÆ'UM (Lat., from Gk. Ἡραῖον, *Hēraion*), THE ARGIVE. The oldest and most noted sanctuary of Argolis, and the chief seat in Greece of the worship of Hera, situated on a spur of Mount Euboœa, between Argos and Mycenæ. The original temple was burned in B.C. 423, and a new one built with great magnificence by the architect Eupolemos of Argos. Of the second building, Pausanias gives a detailed description. It contained two images of the goddess—one of wood, brought from Tiryns, and a statue of gold and ivory by Polyclitus. A few remains of the sculptures are preserved at Athens. The site of the Heræum has been excavated by the American School of Classical Studies (1891-95).

HERALD (from OF. *heralt, heraut*, Fr. *héraut*, from ML. *heraldus, haraldus*, herald, from OHG. *hari, heri*, Ger. *Heer*, AS. *here*, army + OHG. *-walto*, AS. *-wealda*, power, from OHG. *waltan*, Ger. *walten*, AS. *wealdan*, Eng. *wield*). In England, an officer whose duty consists in the regulation of armorial bearings, the marshaling of processions, and the superintendence of certain public ceremonies. In the Middle Ages heralds were highly honored, and enjoyed important privileges; their functions included, in addition to those mentioned, the bearing of messages, whether of courtesy or defiance, between royal or knightly personages; the superintending and registering of trials by battle, tournaments, jousts, and all chivalric exercises; the computation of the slain after battle; and the recording of the valiant acts of the fallen or surviving combatants. The person of a herald, while in the exercise of his duties, was inviolable. The word *heraldus* was used in Germany as early as 1152; the first use in an English document occurs in 1337. The heralds became very influential in the latter half of the fourteenth century. The Heralds' College (q.v.) was incorporated in 1483. Three orders of officials, kings-at-arms, heralds, and pursuivants, are still appointed. There are now in England four kings-at-arms, named by their offices Garter, Clarencieux, Norroy, and Bath; six heralds—Somerset, Chester, Windsor, Richmond, Lancaster, and York; and four pursuivants—Rouge Dragon, Portcullis, Blue Mantle, and Rouge Croix. In Scotland there are at present three heralds and three pursuivants, the principal heraldic officer being Lyon King-at-Arms. Ireland has one king-at-arms, Ulster; two heralds, Cork and Dublin; and two pursuivants, of whom the senior bears the title of Athlone, and the other is called the pursuivant of Saint Patrick. The official costume of a herald consists of a satin tabard or surcoat embroidered with the royal arms, and a collar of SS. See HERALDS' COLLEGE; KING-AT-ARMS; PURSUIVANT.

HERALDRY. Properly, the knowledge of the multifarious duties devolving on a herald (see HERALD); in the more restricted sense, in which it will be considered here, it is the science of armorial bearings.

HISTORY. Though there are many instances in remote times of nations and individuals distinguishing themselves by particular emblems or ensigns, nothing that can properly be called armorial bearings existed before the middle of the twelfth century. The shield of the French knights in the First Crusade presented a plain face of polished metal, and there were only a very few heraldic devices in use in the Second Crusade in 1147. The Anglo-Norman poet Wace, who wrote in the latter half of the twelfth century, mentions devices or cognizances as being in use among the Normans, at the conquest of England, and Wace is corroborated by the Bayeux tapestry of the twelfth century, where there are figures of animals on the shields of the invaders, while the Saxon shields have only borders or crosses. The rude devices on these shields

have nothing approaching to an armorial form or disposition, and in some cases the same device is represented on different shields. Heraldry developed during the Crusades, where it was necessary for a knight to have some mark by which he might be known; it may have been influenced by the Saracen custom of wearing richly embroidered devices. Some armorial insignia were depicted on the shields used in the Third Crusade, which took place in 1189 and the following years; and in the same half-century originated the fleurs-de-lis of France and the lions of England. The transmission of arms from father to son seems to have been fully recognized in the thirteenth century, and in the practice then introduced of embroidering the family insignia on the surcoat, worn over the hauberk or coat of mail, originated the expression *coat of arms.* Arms were similarly embroidered on the jupon, cyclas, and tabard, which succeeded the surcoat, a practice which survived till the time of Henry VIII., when the tabard came to be entirely disused except by heralds, who still continue to wear on their tabards the royal arms.

It was by slow degrees that the usage of arms grew up into the systematized form which it assumes in the works of the established writers on heraldry. The principal existing data for tracing its progress are English rolls of arms yet extant of the times of Henry III., Edward I., and Edward III. The earliest formal treatises date no further back than the end of the fourteenth century, before which time the whole historical part of the subject had been obscured by a tissue of gratuitous fiction, which has misled most subsequent writers up to a very recent period. The writers on the subject represented the heraldry of the tenth and eleventh centuries as equally sharply defined with that of the fifteenth and sixteenth. The arms of William the Conqueror and his sons are described with all their differences; arms are ascribed to the Saxon Kings of England, to Charlemagne, to biblical characters, and even to half-mythical persons and heroes of classical times.

In the infancy of heraldry, every knight assumed what arms he pleased, without consulting sovereign or king-at-arms. Animals, plants, imaginary monsters, things artificial, and objects familiar to pilgrims, were all fixed on. Thus the scallop-shell, the emblem of Saint James and most generally in heraldry called a 'clam,' was frequently borne by Crusaders. Often the object chosen was one whose name bore sufficient resemblance in sound to suggest the name or title of the bearer of it. Devices and mottoes were sometimes chosen on account of their allusive associations: e.g. a broken spear for Brakespeare, or *Festina lente* for the Onslows. This is called Canting Heraldry by the English, *Armes parlantes* by the French. The charge fixed on was used with great latitude, singly or repeated, in any way which the bearer chose, or the form of his shield suggested. But as coats of arms became more numerous, confusion often arose from different knights adopting the same symbol; and this confusion was increased by a practice which crept in of sovereigns or feudal chiefs allowing their arms, or part of them, to be borne as a mark of honor by their favorite followers in battle. Hence different coats of arms came in many instances so closely to resemble each other that it was imperative, for distinction's sake, that the fancy of the bearer should be restrained, and regulations laid down regarding the number and position of the charges, and the attitudes of the animals represented. This necessity led, in the course of time, to the systematizing of heraldry, a process which the rolls alluded to show us was going on gradually throughout the thirteenth and fourteenth centuries. By the time that heraldry was consolidated into a science, its true origin had been lost sight of, and the credulity and fertility of imagination of the heralds led them to invest the most common charges with mystical meanings, and to trace their original adoption to the desire of commemorating the adventures or achievements of the founders of the families who bore them. It was only when heraldry began to assume the dignity of a science that augmentations of a commemorative character were granted. After the science became thoroughly systematized, augmentations and new coats were often granted with a reference to the supposed symbolical meanings of the charges.

In England, the assumption of arms by private persons was first restrained by a proclamation of Henry V., prohibiting their assumption by any one who had not borne arms at Agincourt, except in virtue of inheritance or a grant from the Crown. To enforce the observance of this rule, heralds' visitations or processions through the counties were instituted, and continued from time to time till the reign of William and Mary.

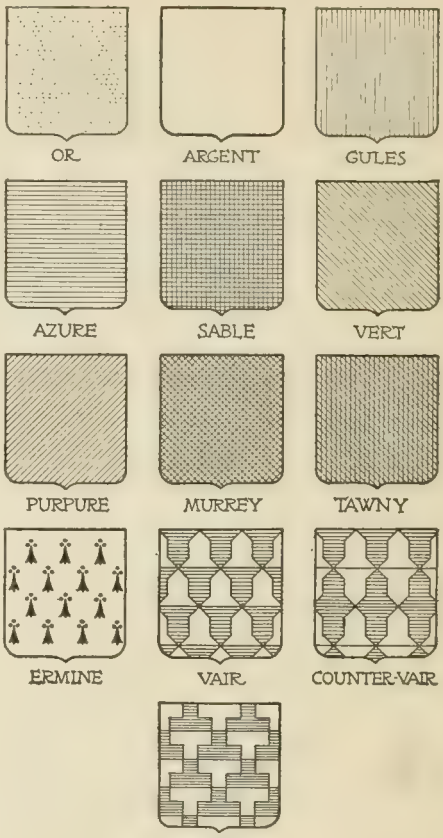
Jurisdiction in questions of arms is executed by the Heralds' College (q.v.) in England, the Lyon Court in Scotland, and the College of Arms in Ireland. No one within the United Kingdom is entitled to bear arms without an hereditary claim by descent or a grant from the competent authority; and the wrongful assumption of arms is an act for which the assumer may be subjected to penalties. The use of arms, whether rightfully or wrongfully, subjects the bearer of them to an annual tax. It is illegal to use without authority not only a coat of arms, but even a crest. Any figure or device placed on an heraldic wreath is considered a crest in questions with the Heralds' College or Lyon Court.

Classification. Besides individuals, communities and States are entitled to the use of arms, and heralds have classified arms, in respect of the right to bear them, under the following ten heads: (1) Arms of dominion; the arms borne by sovereigns as annexed to their territories. (2) Arms of pretension, which sovereigns have borne, who, though not in possession, claim a right to the territories to which the arms belong. Thus, England bore the arms of France from the time of Edward III. till 1801. (3) Arms of community; the arms of bishops' sees, abbeys, universities, towns, and corporations. (4) Arms of assumption; arms which one has a right to assume with the approbation of the sovereign. Thus, it is said, the arms of a prisoner of war may be borne by his captor, and transmitted by him to his heirs. (5) Arms of patronage, added by governors of provinces, lords of the manor, patrons of benefices, etc., to their family arms, as a token of superiority, right, or jurisdiction. (6) Arms of succession, borne quartered with the family arms by those who inherit fiefs or manors, either by will, entail, or donation. Thus, the Dukes of Athole, as having been lords of the Isle of Man, quarter the arms of that island, and the Duke of Argyle

quarters the arms of the lordship of Lorne. (7) Arms of alliance, taken up by the issue of heiresses, to show their maternal descent. (8) Arms of adoption, borne by a stranger in blood, to fulfill the will of a testator. The last of a family may adopt a stranger to bear his name and arms and possess his estate. Arms of adoption can only be borne with permission of a sovereign or king-at-arms. (9) Arms of concession; augmentations granted by a sovereign of part of his royal arms, as a mark of distinction, a usage which, we have already observed, obtained in the earliest days of heraldry; and hence the prevalence among armorial bearings of the lion, the fleur-de-lis, and the eagle, the bearings of the sovereigns of England and Scotland, of France, and of Germany. (10) Paternal or hereditary arms, transmitted by the first possessor to his descendants.

THE ESCUTCHEON. A coat of arms is composed of charges depicted on an escutcheon representing the old knightly shield. The shields in use in England and France in the eleventh and twelfth centuries were in shape not unlike a kite, a form which seems to have been borrowed from the Sicilians; but when they became the recipients of armorial bearings, they were gradually flattened and shortened. From the time of Henry III. the escutcheon has been most frequently represented on seals as approaching a triangular form, with the point downward, the chief exceptions being that the shield of a lady is lozenge-shaped, and of a knight banneret square. To facilitate description, the surface or field of the escutcheon has been divided into nine points, technically distinguished by the following names: A, the dexter chief point; B, the middle chief; C, the sinister chief; D, the honor or collar point; E, the fess point; F, the nombril or navel point; G, the dexter base point; H, the middle base; and I, the sinister base point. It will be observed that the dexter and sinister sides of the shield are so called from their position in relation, not to the eye of the spectator, but of the supposed bearer of the shield.

TINCTURES. Coats of arms are distinguished from one another, not only by the charges or objects borne on them, but by the color of these charges, and of the field on which they are placed. The field may be of one color or of more than one, divided by a partition line or lines varying in form. The first thing, then, to be mentioned in blazoning a shield—that is, describing it in technical language—is the color, or, as it is heraldically called, *tincture* of the field. (See Illustration, *Tinctures.*) Tinctures are either of metal, color strictly so called, or fur. The metals used in heraldry are two—gold, termed *or*, and silver, *argent*—represented in painting by yellow and white. The colors are five—red, blue, black, green, and purple, known as *gules*, *azure*, *sable*, *vert*, and *purpure*. Two other colors have been used occasionally: *tawny* or *tenné* and *murrey* or *sanguiné*. But these are now discarded in most countries. Metals and colors are indicated in uncolored heraldic engravings by points and hatched lines, an invention ascribed to Silvestro di Petrasancta, an Italian herald of the seventeenth century. *Or* is represented by small dots; for *argent*, the field is left plain. *Gules* is denoted by perpendicular and *azure* by horizontal lines; *sable*, by lines perpendicular and horizontal crossing each other; *vert*, by diagonal lines from dexter chief to sinister base; *purpure* by diagonal lines from sinister chief to dexter base; *murrey*, by a combination of vert and purpure; *tawny*, by a combination of vert and gules. The *furs* were originally but two,



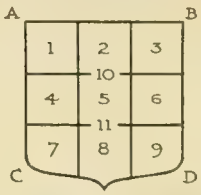
TINCTURES.

ermine and *vair*. The former is represented by black spots or tails on a white ground. *Vair*, said to have been taken from the fur of a squirrel, bluish-gray on the back, and white on the belly, is expressed by blue and white shields, or bells in horizontal rows, the bases of the white resting on the bases of the blue. If the vair is of any other colors than white and blue, they must be specified. Various modifications of these furs were afterwards introduced, among them: *ermines*, or ermine with the field sable and the spots argent; *erminitis*, with a red hair on each side of the black spot; *erminois*, with the field gold and the spots black; *pean*, with the field sable and the spots *or*; *counter-vair*, or vair with the bells of one tincture placed base to base; *potent*, with figures like the heads of crutches; and counter-potent, with the heads of crutches alternately erect and reversed.

It is an established rule of heraldry that metal should not be placed on metal, nor color on color; a rule more rigidly adhered to in English than in foreign heraldry. Among early arms there is one remarkable transgression of it in the arms of the Kingdom of Jerusalem, founded by the Cru-

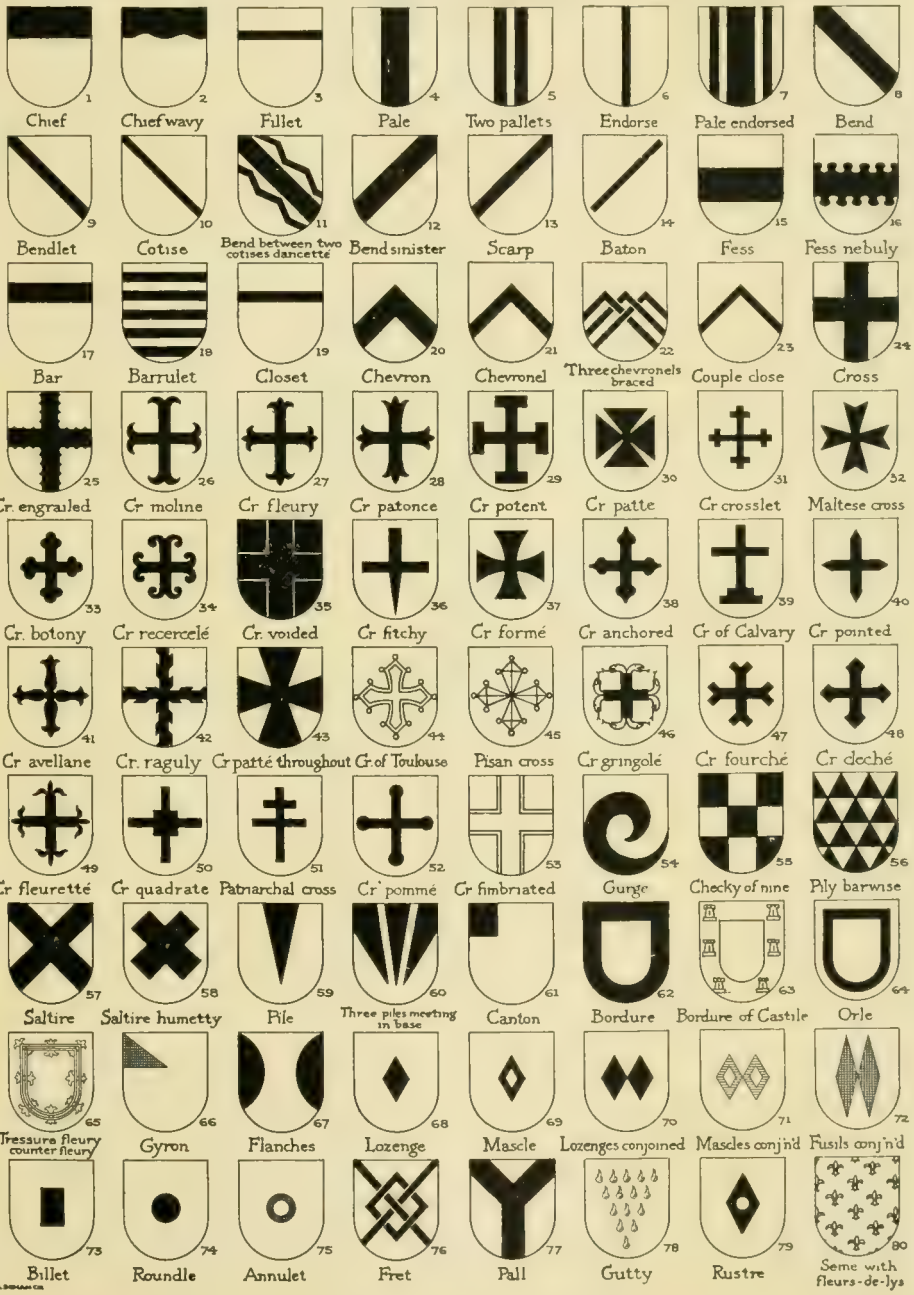
DIVISIONS *of* *the* SHIELD

AB	Upper margin
CD	Lower margin
AC	Dexter margin
BD	Sinister margin
123	Chief
456	Fess
789	Base
147	Dexter tierce
258	Pale
369	Sinister tierce



1	Dexter chief canton
2	Chief point
3	Sinister chief canton
4	Dexter flank
5	Center point
6	Sinister flank
7	Dexter canton of base
8	Base point
9	Sinister canton of base
10	Honor point
11	Nombril point

ORDINARIES & SUBORDINARIES



saders, which are five golden crosses on a silver field. A recognized exception exists wherever a charge lies over a field partly of metal and partly of color, or where an animal is attired, armed, unguled, crowned, or chained with a tincture different from that of his body. Marks of cadency, chiefs, cantons, and bordures are also occasionally exempted from the general rule, being, according to some heralds, not laid on the shield, but *cousu*, or sewed to it.

CHARGES. Everything contained in the field of an escutcheon is called a *charge*. Charges are divided by heralds into the three classes of honorable ordinaries, subordinaries, and common charges. Under the name of ordinaries or *honorable ordinaries* are included certain old and very frequent bearings, whose true peculiarity seems to be that, instead of being taken from extraneous objects, they are representatives of the wooden or metal strengthenings of the ancient shields. Nine are recognized by the best usage. See Plate, ORDINARIES and SUBORDINARIES.

(1) The *chief* (Fig. 1) is the upper part of the shield separated from the rest by a line, and comprising, according to the requirements of heralds, one-third of the whole, though this proportion is seldom rigidly adhered to. Its diminutive is the fillet (Fig. 3), supposed to take up one-fourth the space of a chief, in whose lowest part it stands. The line at the base of the chief may be straight, indented, or irregular.

(2) The *pale* (Fig. 4) is a band or stripe from top to bottom, said, like the chief, to occupy one-third of the shield. It has two diminutives, the *pallet*, one-half the breadth of the pale (Fig. 5), and the *endorse*, one-half of the pallet (Fig. 6).

(3) The *bend* (Fig. 8) is a band crossing the shield diagonally from dexter chief to sinister base. Its diminutives are the *bendlet* or *garter*, one-half of its breadth (Fig. 9), the *cost*, or *cotise*, one-half of the bendlet (Fig. 10), and the *riband*, one-half of the cotise. The bend is sometimes borne between two cotises, in which case it is said to be *cotised* (Fig. 11), a term sometimes applied to the other ordinaries when accompanied with their diminutives.

The *bend sinister* (Fig. 12) is a diagonal band from sinister chief to dexter base. Its diminutives are the *scarp*, one-half of the bend sinister (Fig. 13), and the *baton*, one-half of the scarp (Fig. 14). The baton stops short of the extremity of the field at both ends, and has been considered a mark of illegitimacy.

(4) The *fess* or *fesse* (Fig. 15) is a horizontal band in the middle of the shield, said, like the ordinaries already enumerated, to occupy one-third of it. The lines which bound it may be straight or irregular (Fig. 16).

(5) The *bar* is similar in form to the *fess*, but narrower and never placed in the centre of the shield (Fig. 17). It is rarely used singly. When in pairs they are called *bars gemelles*. The diminutives are the *closet*, theoretically half the width of the *bar* (Fig. 19), and the *barrulet*, half the width of the *closet* (Fig. 18). But these terms are seldom used.

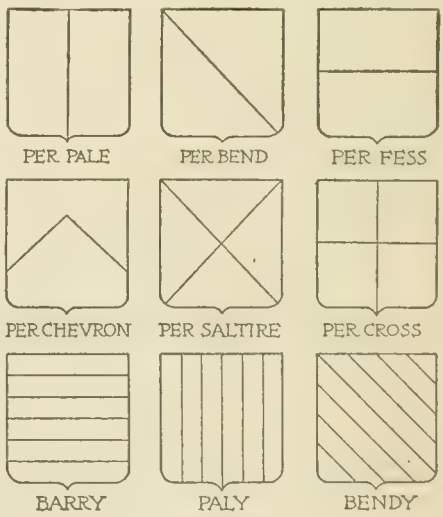
(6) The *chevron* (Fig. 20) is composed of two stripes forming an inverted V. Its diminutives are the *chevronel* (Fig. 21) of half, and the *couple-close* (Fig. 23) one-fourth its width.

(7) The *cross* (Fig. 24) unites the pale and fess, an ordinary which was originally, like the rest, composed of the clamps necessary to the strength of the shield, but had also the deeper meaning of the symbol of the Christian faith. Besides its plain form, the cross was varied in numerous ways, most of these varieties being, however, rather common charges than ordinaries. Of the 39 lesser crosses mentioned by Guillim, or the 385 by Berry in the *Encyclopædia Heraldica*, a few of the most frequently occurring are the following: The *cross moline* (Fig. 26), with the ends turned round both ways; the *cross fleury* (Fig. 27), of which each limb terminates in a fleur-de-lis; the *cross patonce* (Fig. 28), the limb of which has three points; the *cross potent* (Fig. 29), crutch-shaped at the ends; the *cross patté* (Fig. 30), small in the centre, but widening toward the ends; and the *cross crosslet* (Fig. 31), crossed at the ends. The latter is the most frequent of all, and is borne oftener in numbers than singly. Any of these crosses is said to be fitchy when the lower limb terminates in a sharp point, as in Fig. 36. There is also the *cross Maltese;* though not frequent as a heraldic charge, it derives an importance from being the badge of the Knights of Malta, and of many other orders (Fig. 32).

(8) The *saltire*, or Saint Andrew's cross (Fig. 57), is formed by a junction of the bend dexter and bend sinister.

(9) The *pile* (Fig. 59) is a wedge with the point downward. A single uncharged pile should, at its upper part, occupy one-third the breadth of the shield, but if charged, it may be double that width. It is used ordinarily either singly or in threes (Fig. 60).

The *quarter*, consisting of the upper right-hand fourth part of the shield cut off by a horizontal and a perpendicular line, is classed by some authorities with the *honorable ordinaries*, but it is more common to consider it one of the *subordinaries* (see below). It is frequently termed a *canton* (Fig. 61).

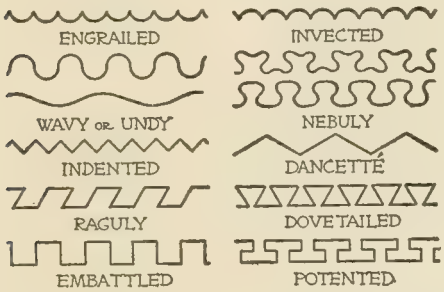


PARTITIONS.

It has been observed that the field of an escutcheon may be of two different tinctures, divided by a partition-line which may vary in direction. (See illustration *Partitions*.) When divided by a partition line in the direction of one of the ordinaries, the shield is said to be *party*

per that ordinary; thus we may have a shield party per pale, bend, fess, chevron, saltire, or cross, though *quartered* is a more usual term than *party per cross*. A shield divided into any number of parts by lines in the direction of a pale, bend, or bar, is said to be *paly, bendy, barry*, the number of pieces being specified, as barry of six. When the field is of a metal and color separated by any of the lines of partition, then the charge placed on it is said to be *counterchanged;* this means that the part of the charge which is on the metal is of the color, and vice versa.

The partition-line which bounds the field, or the boundary-line of an ordinary, is not always even. The commonest forms of irregular partition-lines in use are the *engrailed, invected, wavy, nebuly, embattled, indented,* and *dancetté*. An ordinary engrailed has the points of the engrailed line turned outward, and an ordinary invected, inward. Dancetté differs from the indented by having much larger spaces between the points. All of these terms, even when unmistakably French in origin, are pronounced as if they were English.



The *subordinaries*, or subordinate ordinaries, are generally enumerated as the following, though there is no very broad line of demarkation between them and the common charges.

The Gyron.—When a shield is at once quartered and party per saltire, the division is called gyronny of eight, and each of the triangles is a gyron (Fig. 66). Gyronny of six, ten, or twelve, also occasionally occur, so called according to the number of the triangles.

The *fret* (Fig. 76) is a cognizance derived from the banding or ornamenting of the shield, and a shield covered with this latticework decoration is said to be *fretty*.

The *bordure*, or border (Fig. 62), is a band encircling the shield. It is much used to distinguish different branches of a family, and is often charged with small devices, on which account it has sometimes been reckoned an honorable ordinary (Fig. 63).

The *orle* (Fig. 64) differs from a bordure in not touching the extremity of the shield and is narrower.

The *tressure*, regarded as a diminutive of the orle, is generally borne double, and fleury counterfleury, as in the arms of Scotland (Fig. 65).

The *pall* (Fig. 77) is the archiepiscopal ornament of that name, sent from Rome to metropolitans, and resembling in form the letter Y. By some authorities this is classed as a common charge and not as a subordinary.

The *flanches* (Fig. 67) are the dexter and sinister sides of the shield cut off by a curved line. Flanches are always borne in pairs, and sometimes charged.

The *lozenge* (Fig. 68) is a figure of four equal sides, with the upper and lower angles acute, and the others obtuse.

The *fusil* (Fig. 72) is longer and more acute than the lozenge.

The *mascle* (Fig. 69) is a lozenge perforated, and showing a narrower border. Mascles may have been originally links of chain armor.

A field is said to be *lozengy, fusilly,* or *mascally* when divided by diagonal lines in the direction of these subordinaries. A field divided by horizontal and perpendicular lines into squares of different tinctures is said to be *checky;* in the case of a *fess checky* there are three such rows of squares.

The *inescutcheon* is a small shield charged upon the coat of arms.

The *billet* (Fig. 73) is a rectangle about twice as high as it is wide. When the shield is freely sprinkled with billets it is termed *billety*. Some think the billets represent bricks, stones, or billets of wood; others think they represent letters or *billets*.

Among subordinaries are sometimes reckoned certain circular charges called *roundles* or *roundlets* (Fig. 74), distinguished in English heraldry by different names according to their tinctures. When of or, they are called *bezants;* of argent, *plates;* of gules, *torteaux;* of azure, *hurts;* of purpure, *golps;* of sable, *ogresses* or *pellets;* and of green, *pommes*.

Common Charges. The third class of figures occurring in armorial bearings are the *common charges*. These are representations more or less conventional of familiar objects, which have no necessary relation to the shield, but are in some way emblematic as concerns family or individual history and character. We can enumerate only a few of the charges of most frequent occurrence.

Among the animals borne in coats of arms the lion holds the most important place. As early as the twelfth century the king of beasts was assumed as an appropriate emblem by the sovereign of England. The kings of Scotland, Norway, and Denmark, the native princes of Wales, the counts of Flanders and Holland, and various other European rulers also chose the king of beasts. Lions occur in different positions. The earliest attitude of the heraldic lion is *rampant*, erect on his hind legs, and looking before him, the head being shown in profile, as he appears in the arms of Scotland, and originally did in those of England. This was the normal position of a lion; but as the royal animal came to be used by all who claimed kindred with royalty, and to be granted to favorite followers by way of augmentation, a diversity of attitude was adopted for distinction's sake: *Rampant gardant*, erect on the hind legs, and affronté or full-faced; *Rampant regardant*, erect on the hind legs and looking backward; *Passant*, in walking position, with the head seen in profile; *Passant regardant*, walking and with the head looking behind; *Statant*, with all the four legs on the ground; *Salient*, in the act of springing forward on his prey; *Sejant*, rising to prepare for action; *Sejant affronté*, rising and full-faced, as in the crest of Scotland; *Couchant*, lying down, but with his head erect, and his tail beneath him; *Dormant*, asleep, with his head resting on his fore paws. Some of these terms are used for the other ani-

mals. The lion passant gardant is often blazoned as the *lion of England*, and at a time when terms of blazonry were comparatively few it was confounded with the leopard, and hence the lion passant and rampant gardant came to be called respectively the *lion-leopardé* and *leopard-lionné*.

Two lions may be depicted: *rampant combatant*, i.e. face to face; or *rampant addorsed*, placed back to back, or *counter-passant*, i.e. passing the contrary way to each other. The lion is said to be *naissant* when he appears to be rising out of the centre of an ordinary. Among leonine monsters we have two-headed lions, bicorporate and tri-corporate lions, lion-dragons, and lion-poissons. There is also the Bohemian lion, with two tails, and the more celebrated winged lion of Saint Mark, adopted by the Republic of Venice. Two or more lions borne on one shield are sometimes (though never when on a royal coat) blazoned *lioncels*.

Bears, boars, bulls, and stags are favorite heraldic beasts. A stag walking is said to be *trippant;* when lying down with his head erect he is *lodged;* when running he is *courant;* he is *at gaze* when a lion would be statant-gardant; he is *attired* of any tincture when his horns are of that tincture. The animals that possess horns and hoofs are said to be *armed* in respect to them. The heads and limbs of animals are often borne as charges, and they may be either *couped*, cut off in a straight line, or *erased*, cut off with a jagged edge. When the head is borne without any part of the neck, and full-faced, it is said to be *caboched* or *caboshed*. When the hair of an animal is of a different tincture from the body the animal is said to be *crined* of this color. Animals, as well as other common charges, are usually represented in a purely conventional manner, and frequently bear no resemblance to the object for which they are named.

Of birds, there is the *eagle*, which was, next to the lion, the most favorite cognizance of royal personages, and was adopted by the German emperors, who claimed to be successors of the Cæsars of Rome. The Imperial eagle had at first but one head; the monstrosity of a second head seems to have arisen from a dimidiation of two eagles, to represent the Eastern and Western empires. (See section *Marshaling of Arms.*) The eagle of heraldry is most generally *displayed*, i.e. its wings are expanded; sometimes it is *preying*, or standing devouring its prey. The *allerion*, the cognizance of the Duchy of Lorraine

and the family of Montmorency, was originally but a synonym for the eagle (assumed, perhaps, as an anagram for the word Lorraine), but modern heralds have degraded it into a nondescript creature without beak or feet. The *martlet* was originally a martin, which has also in course of time been deprived by heralds of its legs and

beak. (See CADENCY.) The mythical phœnix, the pelican, the swan, the cock, the falcon, the raven, the parrot, or popinjay, and the peacock are all of tolerably frequent occurrence. The pelican generally has her wings placed back to back, and is depicted pecking her breast; she is then said to be *vulned*, i.e. wounded. When in her nest, feeding her young, she is called a pelican *in her piety*. A peacock borne affronté with his tail expanded is said to be *in his pride*. Birds of prey are armed of the color of which their beak and talons are represented. Such as have no talons are *beaked and membered;* i.e. the beak and legs are of a different color from the body. The cock is said to be armed crested and jelloped, the latter term referring to his comb and gills. Birds having the power of flight are, in respect to their attitude, *close*, *rising*, or *volant*.

DRAGON

GRIFFIN

WYVERN

COCKATRICE

MERMAID

SEA-LION

SUN
IN HIS SPLENDOR

MOON

ESTOILE

GARB

POMEGRANATE

MAUNCH

Fishes and reptiles occur as charges: the former are said to be *naiant* if drawn in a horizontal, and *haurient* if drawn in a perpendicular position; and the *dolphin*, in reality straight, is conveniently borne *embowed* or bent. Sometimes the conventional heraldic form of an animal differs very greatly from its true form, as in the case of the antelope of heraldry, which has the head of a stag, a unicorn's tail, a tusk issuing from the tip of the nose, a row of tufts down the back of the neck, and similar tufts on the tail, chest, and thighs. Of 'animals phantastical,' we have, among others, the griffin, wyvern, dragon, unicorn, basilisk, harpy. We have the human body in whole or part, as a naked man or 'savage,' also arms, legs, hearts, Moors' heads, Saracens' heads, and that strange heraldic freak, the three legs conjoined carried in the escutcheon of the Isle of Man.

Of plants, there are *roses*, *trefoils*, *quatrefoils*, *cinquefoils* (conventional representations of flowers with three, four, and five leaves), *leaves*, *garbs* (i.e. sheaves of corn), *trees*, often *eradicated* or *fructuated* of some other color, and above all the celebrated *fleur-de-lis*, used as a badge by Louis VIII. of France in 1223. When the charge is repeated a large number of times the term *semé* is applied to it. When a plant, animal, or other charge is blazoned *proper*, what is meant is that it is of its natural color.

The heavenly bodies, the sun, moon, and stars, are also pressed into the service of heraldry, as are things inanimate and artificial without number, particularly such as were familiar to the warriors and pilgrims of the twelfth and thirteenth centuries. Helmets, buckles, shields, hatches, horseshoes, swords, arrows, battering-rams, pilgrim's staves, mullets (or spur-rowels), and water-boujets, or bags, in which in crusading times water was carried long distances across the desert; also the clarion or war-trumpet, sometimes erroneously called a *rest*, because it was supposed to represent a rest for a lance. Even the letters of the alphabet have been used as charges.

When the field or any charge is covered with drops it is called *gutty;* when adorned with fleurs-de-lis it is called *fleury* or *flory*. When an ordinary is made up of squares of alternate metal and color it is called *compony* or *gobony*. When an ordinary has a border of different tinctures it is said to be *fimbriated*.

Charges may be placed either simply on the field or on one of the ordinaries; in some instances one of the ordinaries is placed over a charge, in which case the charge is said to be *debruised* by the ordinary. Three charges of one kind are placed two above and one below, unless blazoned *in fess* or *in pale*. In the fourteenth and fifteenth centuries the simplicity of early heraldry began to be departed from by accumulating a variety of charges on one shield, and in later times we have sometimes a charge receiving another charge like an ordinary. The growing complexity of shields arose from augmentations granted to distinguish the younger branches of a family, or charges assumed from the maternal coat by the descendants of an heiress. In the end of the eighteenth and beginning of the nineteenth century, a practice prevailed for a time of introducing into armorial bearings matter-of-fact landscapes, representations of sea fights, and of medals and decorations worn by the bearer, setting all heraldic conventionalities at defiance, and dealing in details not discernible except on the minutest inspection.

The arms of the different members of a family have been distinguished from one another, sometimes by the use of a bordure or other difference; and sometimes, especially by English heralds, by the use of certain figures called *marks of cadency*. (See CADENCY.) Sometimes the differences and marks of cadency are called *diminutions*.

Besides the heraldic devices depicted on the shield, there are the following borne external to it—the helmet, the mantling, the wreath, the crest, the motto and scroll, the supporters, and the coronet.

The *helmet*, originally a piece of defensive armor, became in the course of time one of the usual accompaniments of the shield; and placed over the arms, it came by its form to mark the rank of the wearer. These distinctions date from the reign of Queen Elizabeth, and are applicable only to British heraldry.

NATIONAL COATS OF ARMS

AUSTRIA-HUNGARY

BELGIUM

DENMARK

FRANCE

GERMANY

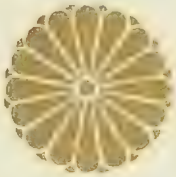
GREAT BRITAIN

ITALY

RUSSIA

SPAIN

SWEDEN & NORWAY



JAPAN

GREECE

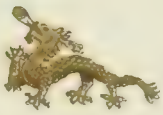
NETHERLANDS

PERSIA

PORTUGAL

TURKEY
IMPERIAL SIGNET

SWITZERLAND



CHINA

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The *mantling* is an embellishment of scroll-work flowing down on both sides of the shield, and originating in the *cointoise*, or scarf, wrapped round the body in the days of coat armor.

From the centre of the helmet, within a *wreath* of two pieces of silk usually of the first two colors of the armorial bearings, issues the crest, originally a special mark of honor worn only by heroes of great valor, or advanced to a high military command; now an inseparable adjunct of the coat of arms in English, though not in Continental heraldry, and sometimes assumed or changed arbitrarily, although this is illegal.

The *scroll*, placed over the crest or below the shield, contains a *motto* bearing in many cases an allusion to the family name or arms. The motto was originally the war-cry of the bearer.

Supporters are figures or animals standing on each side of the escutcheon, and seeming to defend or support it. They were in their origin purely ornamental devices, which only gradually acquired an heraldic character. In England the right to use supporters is confined to the royal family, peers, peeresses, and peers by courtesy, Knights of the Garter, Knights Grand Cross of the Bath, and a very few families whose ancestors bore supporters before their general use was restricted. In Scotland supporters are also used by the baronets of Nova Scotia and the chiefs of various families. They have sometimes been conferred on towns, e.g. Liverpool, Belfast.

The crown of the sovereign, the mitre of the bishop, and the coronet of the nobility are adjuncts appended to the shield of those whose dignity and office entitle them to that distinction.

Blazonry. This is the art of describing, in technical terms, the charges borne in arms—their positions, gestures, tinctures, etc., and the manner of arranging them on the shield. As heraldry, though arbitrary, is very exact, the rules of blazoning are observed on all occasions with the most rigid precision. The following are the most important: In blazoning or describing a coat of arms, avoid repetitions and use as few words as possible. Begin with the field, naming the tincture or tinctures, and mentioning the lines by which it is divided—*per pale, per fess*, etc., if such there be—and noticing if they are indented, engrailed, or the like, it being taken for granted that they are straight unless the contrary is mentioned. The charges are named next, beginning with the most important and nearest the centre, giving their number, position, and tincture; e.g. the Affleck family bear *argent, three bars, sable;* the Aldboroughs, *barry of ten, argent and azure, a lion rampant, gules.* Usually the ordinaries and their diminutives come first; but the *chief, bordure*, or *canton* generally comes last; e.g. the Gainsboroughs bear *or frettygules, a canton, ermine.* Where the principal charge is not in the centre its position must be named, as in *first quarter.* When an ordinary *debruises* another charge, the latter is named first unless some other direction is given. Two charges are *in pale*, i.e. one above the other; three are represented two above, one below; when a *fess* or *bend* is between six similar charges, three are in chief and three in base. In all other cases the position of the charges must be described. When the ordinary bears a charge and there are also other charges in the field, the latter are named before the charges on the ordinary. When a tincture occurs twice it is not repeated, but *of the field, of the first*, etc., are used. The Anglesey family bears *sable, on a cross engrailed between four eagles displayed argent, five lions passant-gardant of the field.* When there is an equal number of two charges, 'as many' is used instead of repeating the number. The Leiths bear *or, a cross-crosslet pitchy, sable, between three crescents in chief, and as many lozenges in base, gules.* The Parkers bear *gules, on a chevron, between three keys erect, argent, as many fleurs-de-lis of the field.* Finally the differences, crests, and supporters are described. A full knowledge of blazonry can be acquired only by the careful study of many examples.

Marshaling of Arms. This is the combining of different coats of arms in one escutcheon, for the purpose of indicating family alliance or office. In the earlier heraldry it was not the practice to exhibit more than one coat in a shield, but the arms of husband and wife were sometimes placed *accollé*, or side by side, in separate escutcheons; or the principal shield was surrounded by smaller ones, containing the arms of maternal ancestors; and not infrequently maternal descent or marriage was indicated by the addition of some bearing from the wife's or mother's shield. Then followed *dimidiation*, where the shield was parted per pale, and the two coats placed side by side, half of each being shown. By the more modern custom of impaling, the whole of each coat is exhibited, a reminiscence of the older practice being retained in the omission of bordures, orles, and tressures on the side bounded by the line of impalement. The most common case of impalement is where the coats of husband and wife are conjoined, the husband's arms occupying the dexter side of the shield, or place of honor, and the wife's the sinister side. Bishops, deans, heads of colleges, and kings-at-arms impale their arms of office with their family coat, giving the dexter side to the former.

A man who marries an heiress (in heraldic sense) is entitled to place her arms on a small shield called an *escutcheon of pretense*, in the centre of his achievement, instead of impaling them.

Quartering, or the exhibiting of different *coats* on a shield divided at once perpendicularly and horizontally, is the most common mode of marshaling arms, a practice which, however, was unknown till the middle of the fourteenth century. The divisions of the shield are called quarters, and are numbered horizontally, beginning at the dexter chief. The most common object of quartering is to indicate descent. The coats quartered in an escutcheon must all have been brought in by successive heiresses, who have intermarried into the family. In the case of a single quartering, the paternal arms are placed in the first and fourth quarters, and the maternal in the second and third. The third and fourth quarters may, in after-generations, be occupied by the arms of a second and third heiress. Sometimes an already quartered coat is placed in one of the four quarters of the escutcheon, then termed a grand quarter. We occasionally find a shield divided by perpendicular and horizontal lines into six, nine, or even more parts, each occupied by a coat brought in by an heiress; and in case of an odd number of coats, the last division is inconveniently crowded by the accu-

mulation of coats, including the several coats to which each heiress may, in a similar way, have become entitled. In Germany, sometimes twenty or thirty coats are found marshaled in one escutcheon; but in British heraldry, families entitled to a number of quarterings generally select some of the most important.

Sovereigns quarter the ensigns of their several States, giving precedence to the most ancient, unless it be inferior to the others in importance. In the royal escutcheons of the United Kingdom, England is placed in the first and fourth quarters, Scotland in the second, and Ireland in the third; the relative positions of Scotland and England being, however, reversed on the official seals of Scotland. Spain bears the arms of Leon in the first and fourth quarters, and Castile in the second and third. An elected king generally places his arms surtout on an escutcheon of pretense.

National Coats of Arms. The coats of arms whose use has obtained official sanction by national governments present in most cases the family heraldic insignia of their sovereigns. The English arms, for instance, have reflected every claim of family inheritance of the royal line since the origin of coats of arms in the twelfth century. They were, under Richard Cœur de Lion and his immediate successors, the three leopards of the Plantagenet House. When Edward III. laid claim to the crown of France he quartered with his arms the lilies of the royal house of that country. The Irish harp was added when Henry VIII. took the title of king of that country. Similarly, when the Stuart line succeeded they placed the rampant lion of Scotland in the upper right-hand field. William III. placed a scutcheon with the line of the House of Orange in the centre of the British shield, and the Hanoverian sovereigns replaced this by their family scutcheon. The lilies of France were removed with the disuse of the French title, in 1801, and the scutcheon of the House of Hanover on the accession of Queen Victoria in 1837. Since that time the British coat of arms in its full form has consisted of the shield with four fields, two occupied with the golden leopards of England, the other two occupied by the old arms of Scotland and Ireland respectively. Above the shield is a helmet, and still above this the crown with a golden crowned lion. Surrounding the shield is the Order of the Garter with its legend. Below the shield are two clusters of branches, made up of the English rose, the Scotch thistle, and the Irish shamrock intertwined, and the motto *Dieu et Mon Droit*. As supporters, there are dexter, a golden crowned lion, and sinister, a silver unicorn with a crown around his neck and a chain hanging from this.

France, after having used at various times the oriflamme, the lilies, the Napoleonic eagle, and other emblems, possesses, under the present republic, no authoritative or universally applicable coat of arms. By a decree passed in 1870, however, a seal was adopted consisting of a seated female figure holding a bundle of lictor's rods. In 1896 a decorative emblem was authorized consisting of the initials 'R. F.' (*République française*) surrounded by a crown of laurel leaves, with French flags crossed at the back, oak and laurel branches below, the Order of the Legion of Honor and the fasces at the back. A common device, too, is a shield bearing the national colors in three vertical bars, with the fasces in the central space and the letters R and F on olive branches to right and left.

The arms of the German Empire consist of the great double-headed black eagle of the Empire, surmounted by the Imperial crown and bearing on its breast the Prussian coat of arms. This is a silver shield with a single-headed eagle holding in its claws the royal ball and sceptre, with the Hohenzollern arms on its breast. The silver shield is surrounded by the chain and pendant of the Order of the Black Eagle.

Russia and Austria-Hungary also use the double-headed eagle, in both cases both heads being crowned, and in both with an Imperial crown above. In the Russian arms the eagle bears on its breast a shield with Saint George; in the Austrian a shield with the arms of Hapsburg, Austria, and Lorraine.

The coat of arms of Spain consists of a shield on which the arms of Castile and Leon are quartered, a point below bearing the pomegranate of Granada, and a small central shield bearing the arms of Bourbon-Anjou.

The coat of arms of Italy is a shield with the silver cross on a red field, covered with a red ermine-lined baldaquin, surmounted by the Italian crown. The cross was granted to the counts of Savoy by the Knights Hospitalers in the fourteenth century as an acknowledgment of help given to them against the Turks.

Similarly, the coats of arms of other European countries represent in most cases the origin and fortunes of their royal families.

The newly formed nations of America found it necessary to adopt coats of arms deliberately instead of using the personal devices of their rulers. The Congress of the United States appointed a committee to prepare a coat of arms and a seal for the new nation on July 4, 1776, the very day of the Declaration of Independence. The devices reported by this and by several succeeding committees were not, however, satisfactory, and it was not till June 20, 1782, that the coat of arms was finally approved. Since that time it has not been changed. It consists of the American eagle with a shield upon its breast showing thirteen stripes, alternately silver and red, and thirteen white stars on a blue ground to indicate the original States, holding in its talons an olive branch and a sheaf of arrows, and in its beak a scroll with the motto *E Pluribus Unum*. It is surmounted by a group of stars appearing through a cloud, to indicate the emergence of a new nation in the world. Each State of the American Union has its own coat of arms, though none of them has adopted an individual flag, all using the national flag.

Most of the republics of Central and South America adopted coats of arms on the attainment of their independence, usually introducing into them some objects of local as well as symbolical significance. Mexico, for instance, in 1823, adopted as its national coat of arms a figure of an eagle tearing a snake in its beak, and poised upon a 'nopal' or cactus growing on a rock. The rock and the nopal are both connected with the old name of the city and province of Mexico, *Tenochtitlan*. This coat of arms was afterwards changed by Maximilian, but was restored on the downfall of his empire. The coat of arms of Peru contains a figure of the llama, the national beast of burden, and of the

NATIONAL COATS OF ARMS

MEXICO

GUATEMALA

HONDURAS

SALVADOR

NICARAGUA

COSTA RICA

CUBA

HAITI

UNITED STATES

SANTO DOMINGO

BRAZIL

VENEZUELA

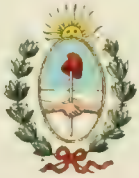
COLOMBIA

ECUADOR

PERU

CHILE

BOLIVIA



ARGENTINE REPUBLIC

URUGUAY

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tree from which the Peruvian bark or cinchona is taken. That of Guatemala shows the bird Quezal, the 'pito real,' or royal bird, of the old Spanish discoverers. The peaks of the Andes occur in several of the South American national coats of arms. That of the Republic of Brazil, adopted in 1889, consists of a five-pointed star with a round shield placed upon it. On this shield are figured the stars of the Southern Cross, and it is surrounded by twenty silver stars, representing the States of the Republic. Below are a sword and branches of laurel and of the tobacco-plant, with an inscription. See accompanying Plates, NATIONAL COATS OF ARMS.

The terms and usages of heraldry vary somewhat in the different countries. In this article the rules of English heraldry have been followed. Information on the usages in other countries can be obtained from the books cited. For information on the details of heraldry, consult: the standard works of Guillim, *Display of Heraldry* (London, 1610; 6th ed. 1724); Edmondson, *Complete Body of Heraldry* (London, 1780); and Nisbet, *System of Heraldry* (London, 1722-43; 3d ed., London, 1816); and for a more discriminating view of the subject, Gourdon de Genouillac, *L'Art heraldique* (Paris, 1889); Hulme, *History, Principles, and Practice of Heraldry* (London and New York, 1892); Woodward and Burnet, *A Treatise on Heraldry, British and Foreign* (Edinburgh, 1891); Eve, *Decorative Heraldry* (London and New York, 1897).

HERALDS' COLLEGE, or COLLEGE OF ARMS. A collegiate body, founded by Edward IV. in 1464, and chartered by Richard III. in 1483. It consists of the heraldic officers of England. After various charters had confirmed its privileges, it was reincorporated by Philip and Mary, who bestowed on it Derby House, on the site of which in Doctors' Commons the present college was built by Sir Christopher Wren.

The presidency of the college is vested in the Earl-Marshal, an office now hereditary in the family of Howard, Duke of Norfolk; he nominates the three kings-at-arms, six heralds, and four pursuivants, who are the members of the collegiate chapter. Persons having an hereditary claim to arms, which has been disused for one or more generations, are empowered by the Heralds' College to resume them on proof and registration of pedigree. A person who has no hereditary claim, and wishes a grant of arms, must memorialize the Earl-Marshal, and show that he is in condition to 'sustain the rank of gentry.' An important department of the college is the recording of pedigrees. Any pedigree showing the existing state or descent of a family may, if accompanied with sufficient evidence, be entered on the books of the college. The members have salaries, but derive their principal income from fees charged for assistance in tracing pedigrees and titles, and for the granting and registration of arms. Since a long time the college has lost all authority to enforce its regulations. In Scotland the corresponding functions belong to the Lyon Court (q.v.), and in Ireland to the Office-of-Arms. See HERALDRY.

HERAT, hĕr-ät′. The capital of the province of the same name in Afghanistan (q.v.). It is situated in the western part of the country, on the River Heri-Rud, about 50 miles south of the Russian frontier, and the same distance east of the Persian border (Map: Afghanistan, II 4). The town is surrounded by strong fortifications, having towers and gates, and with a strong citadel at the northern end. The streets are narrow and crooked and the buildings are unsightly. There is an ancient ruined mosque. The surrounding valley is of remarkable natural beauty and fertility. Fine fields of grain and attractive gardens adorn the landscape. The King's Garden was formerly famous. Herat exports carpets, blades, and rose-water. Its position on the route from Persia to India explains its commercial importance, while its proximity to the Russian border lends to it great strategic and political significance. The population, formerly much greater, is estimated at 45,000, and is very heterogeneous. Herat is supposed to have been founded by Alexander the Great. In the seventh century it came under the dominion of the Arabs. It was conquered by Timur in 1381, under whose reign it grew to be a centre of Persian learning and art. In 1510 it passed into the hands of Persia. The Afghans took it in 1749. During the civil wars in Afghanistan, Herat became independent, and remained so from 1823 to 1863, when it once more became a part of Afghanistan.

HÉRAULT, ā′rō′. A maritime department in the south of France (q.v.), in Languedoc, bounded on the southeast by the Gulf of Lyons (Map: France, K 8). Area, 2393 square miles. Population, in 1896, 469,684; in 1901, 489,421. It is occupied in the north and northwest by the Lower Cévennes. The principal rivers are the Hérault (from which the department derives its name), the Orb, and the Lez. The coast-line is about 66 miles in length; and along the shore, from Agde to the Vidoule, are numerous étangs or marshy lakes, united by the Canal-des-étangs, and communicating with the sea. In the neighborhood of the étangs the climate is unhealthful, but elsewhere throughout the department it is usually fine. Hérault ranks among the foremost wine-growing departments of France. Woolen, silk, and cotton fabrics, leather, brandy, liquors, etc., are manufactured. Coal and copper mines as well as quarries of marbles, building-stone, granite, etc., are worked. Hérault supplies a great part of the salt used in France. Capital, Montpellier.

HÉRAULT DE SÉCHELLES, dē sā′shĕl′, MARIE JEAN (1760-94). A French revolutionist, born in Paris. An author and advocate, imbued with the teachings of Diderot, he was rather a philosopher than a revolutionist, and was at first but moderately attracted by the radical element in the Legislative Assembly, to which he was elected in 1791. But he soon took his stand with the extreme left, and supported Danton in the Revolution of August and September (1792). He was Deputy from the Department of Seine-et-Oise to the Convention of the same year, and voted for the King's death. As a member of the Committee of Public Safety, he aroused the enmity of Robespierre, who, under the pretext that he had had traitorous dealings with the Army of the Rhine, insisted upon his arrest and execution. The best of his writings were printed under the title *Voyage à Montbard* (last ed. 1890).

HERB (OF., Fr. *herbe*, from Lat. *herba*; probably connected with OLat. *forbea*, food, Gk. *φορβή*, *phorbē*, pasture, *φέρβειν*, *pherbein*, to feed). Any plant that contains no woody tissue, or, at

least, none above the ground. Herbaceous plants commonly die down to the ground at the close of the growing season. In some herbaceous plants, such as annuals, the entire plant dies during the resting period.

HERBA'RIUM (Lat., from *herba*, herb). A systematic collection of dried plants, representing the flora of one or more regions. An herbarium represents the best possible record of plants, and is indispensable as a basis for any systematic presentation of a flora. Of course, the study of living plants in their natural surroundings is the ideal method, and is employed as far as possible. But such a method is necessarily incomplete, and must be supplemented by the complete records of the herbarium. One of the essential features of an herbarium is that it contains the specimens, called 'types,' from which the original descriptions of species and genera were drawn. These types are kept for reference, so that there may be no uncertainty as to the plants described by different authors; and it may be said that, in a certain sense, the value of an herbarium is measured by the number of types and authentic specimens it contains. Large herbaria thus become centres of taxonomic work. Owing, however, to the great expense involved in maintaining them, extensive herbaria are not numerous; the local collections possessed by a large number of institutions and individuals are generally quite small.

In the United States there are three herbaria of first rank, and each is the background of continual publication. The oldest is the *Gray Herbarium*, which belongs to Harvard University. Its great value lies in the fact that it contains the vast majority of the older types of American plants, but its annual additions are also very large. The *Herbarium of the New York Botanical Garden*, formerly at Columbia University, was developed remarkably during the closing years of the nineteenth century. Its accumulation of material and wealth of types makes it indispensable in any taxonomic work. The *United States National Herbarium*, stored in the United States National Museum, has become a collection of national importance, since it contains a vast accumulation of material brought together by Government collectors, and also many of the most important collections of the early Government surveys. After these three great collections, those at the Missouri Botanical Garden (Saint Louis) and at the Field Columbian Museum (Chicago) are probably next in importance. Many of the larger universities also contain noteworthy collections. The three greatest herbaria in Europe deal more with the flora of the whole world than do the American herbaria. The greatest of all herbarium collections is that at the Royal Gardens at Kew, which has been enriched for many years by means of the numerous colonial enterprises of the British Empire. The *Herbarium of the Jardin des Plantes* at Paris is rich in older types, especially of American plants. The University of Berlin has built up a large herbarium, which has become one of first importance. Probably next in importance are the herbaria at Geneva, Vienna, and Saint Petersburg.

For directions as to the collection of plants and their preparation for the herbarium, consult Bailey, *Botanizing* (Providence, R. I., 1899).

HERBART, hĕr'bärt, JOHANN FRIEDRICH (1776-1841). A German philosopher. He was born at Oldenburg, May 4, 1776. He studied at Jena, where Fichte was just beginning to be an influential factor in the university life, and for a while he was ardent in his loyalty to Fichte's views; but after more reflection he found himself obliged to reject much of that system, and to form one of his own. After tutoring for several years in Switzerland, he qualified as docent in philosophy and pedagogy at Göttingen in 1802, and three years later was appointed professor extraordinarius. In 1809, at the instance of W. von Humboldt, then at the head of the Department of Public Instruction, he was called to a professorship of philosophy and pedagogy at Königsberg, to succeed Krug, who succeeded Kant. As in Göttingen, he conducted a seminar at Königsberg; but in 1833 he was recalled to Göttingen, where he continued in incessant pedagogical and philosophical activity until his death, August 14, 1841. His writings were collected and published by Hartenstein in 12 volumes (Leipzig, 1850), and reprinted in Hamburg (13 vols., 1883-93). Another edition is appearing at Langensalza. His pedagogical works have been published in two volumes at different times (1873, 1875, and 1880). Some of his letters were published in 1871 and in 1877. His chief works are: *Allgemeine Pädagogik* (1806); *Hauptpunkte der Metaphysik* (1806); *Allgemeine praktische Philosophie* (1808); *Lehrbuch zur Einleitung in die Philosophie* (1813); *Lehrbuch zur Psychologie* (1816; translated into English by M. K. Smith, 1891); *Psychologie als Wissenschaft* (1824); *Allgemeine Metaphysik* (1828-29). In addition to the one mentioned above, the following translations should be mentioned: *Application of Psychology to the Science of Education*, translated by Mulliner (New York, 1898); *Herbart's ABC of Sense-Perception, and Minor Pedagogical Works*, translated by Eckoff (ib., 1896); *The Science of Education*, translated by H. M. and E. Filkin (Boston, 1893); *Introduction to the Pedagogy of Herbart*, translated by Zimson (ib., 1894); *Outlines of Educational Doctrine*, translated by Lange, and annotated by De Garmo (New York, 1901).

His philosophy is a thorough-going atomism (q.v.), according to which the universe is constituted of monads or 'reals,' simple, unchangeable, and in their real nature unknowable. These 'reals' stand in accidental relations to each other, and it is the changes in these relations that constitute the process of change in the world of experience. The 'reals' disturb each other and provoke reaction in each other in self-defense. Such reactions are our ideas, which are called for by the effort of our unknowable souls to maintain themselves. These ideas in turn tend to preserve themselves, and conscious life is the behavior of these ideas toward each other in the way of conflict or of mutual support—conflict when they are totally or partially opposed; support when they are alike. When conflict occurs, the intensity of ideas is diminished; diminution of intensity beyond a certain point means the disappearance of ideas 'below the threshold of consciousness.' The relation between ideas is thus a mechanical relation and psychology is the mechanics of ideas. In the mechanical relation of ideas, those already in consciousness have an important part to play with regard to new ideas just appearing. The ideas already present are

called the apperceiving ideas, and the new ideas are said to be apperceived. The problem of education is to present such new ideas as can be most easily apperceived, i.e. incorporated with the old ideas to form knowledge. The central principle of all Herbart's reasoning is the abstract law of contradiction, interpreted metaphysically. That is, nothing can be ultimately real of which two contradictory predicates can be asserted. To predicate unity and multiplicity of an object is to predicate contradictions. Hence ultimate reality must be absolutely unitary and without multiplicity, hence also without change. Herbart's influence has been great both in philosophical and pedagogical lines. Among prominent Herbartians of recent times and of the present day may be mentioned M. A. Drobisch, O. Flügel, G. Hartenstein, M. Lazarus, H. Steinthal, L. Strümpell, W. F. Volkmann, T. Waitz, and R. Zimmermann. In America there is a Herbart Society, of which Prof. Charles De Garmo is the leading spirit, and which issues an important *Year-Book*. Herbartian bibliography is very extensive. For the life of Herbart, consult: Hartenstein, in the introduction to his *Herbarts kleinere philosophische Schriften und Abhandlungen* (Leipzig, 1842); Allihn, "Ueber das Leben und die Schriften J. F. Herbarts," in *Zeitschrift fur exacte Philosophie* (Leipzig, 1860), which contains a bibliography; Hennig, *J. F. Herbart* (Leipzig, 1877). For an account or for criticism of his views, consult: Lotze, "Ueber Herbarts Ontologie," in *Zeitschrift für Philosophie* (Leipzig, 1843); Fechner, *Zur Kritik der Grundlagen von Herbarts Metaphysik* (ib., 1853); Kaftan, *Soll und Sein* (ib., 1872); Lipps, *Zur Herbart'schen Ontologie* (Bonn, 1874); Just, *Die Fortbildung der Kant'schen Ethik durch Herbart* (Eisenach, 1876); Wigget, *Pestalozzi und Herbart* (Leipzig, 1891); De Garmo, *Herbart and the Herbartians* (New York, 1895); Adams, *The Herbartian Psychology Applied to Education* (Boston, 1898); also the various writings of the Herbartians mentioned above.

HERB BENNETT. An aromatic herb. See GEUM.

HERBECK, hĕr'bĕk, JOHANN VON (1831-77). An Austrian musician, born in Vienna. He was practically a self-educated musician, but by hard work rose rapidly from the position of chorister to that of professor in the Vienna Conservatory. In 1866 he was made chief Court Kapellmeister, and from 1871 to 1875 he was director of the Imperial Opera. He wrote many excellent part-songs and some instrumental music.

HERBELIN, âr'blăn', JEANNE MATHILDE HABERT (1820—). A French painter of miniatures, born at Brunoy, Seine-et-Oise. She studied oil painting with her uncle, Belloc the artist, but was advised by Eugène Delacroix to confine herself to miniatures, and speedily reached the front rank in that branch of art, in which she created a new style. She exhibited ten miniatures in the Salon of 1848, and received her first-class medal at the Exhibition of 1855 for "Enfant tenant une rose," "Souvenir," and "Petite fille jouant avec un éventail," while one of her miniatures was requested for the Luxembourg Gallery, the first of its kind admitted there. Besides some ideal heads and genre studies, Madame Herbelin painted some notable miniature portraits, such as those of Guizot, Isabey, Robert Fleury, Rossini, E. Souvestre, Rosa Bonheur, and Eugène Delacroix.

HERBELOT, âr'blō', BARTHÉLEMY D' (1625-95). A celebrated French Orientalist, born in Paris. He studied also in Italy, and was likewise for a time secretary and interpreter of Oriental languages to the French King. Three years before his death he was appointed professor of Syriac in the Collège de France. His celebrated work, *Bibliothèque Orientale*, was published after his death by Galland (Paris, 1697), and afterwards with a supplement (Maestricht, 1776-81); but the best edition is that published at The Hague (4 vols., 1777-82). The work, which was not quite finished, contains extracts from a large number of Arabian, Persian, and Turkish authors, with abundant historical, biographical, and illustrative material relating to the peoples of the East.

HERBERAY DES ESSARTS, âr'brâ' dâ zĕs'sär', NICOLAS DE (?-1552). A French officer and translator. He was a Picard noble, and an officer in the royal artillery under Francis I., whom he accompanied to Madrid in 1525. Here he read, and, at the King's request, translated from the Spanish the romance of *Amadis of Gaul* (1540-48). His other works include: *L'amant maltraité de sa mye* (1539); *Le premier livre de la chronique de Dom Flores de Grèce, chevalier des Cignes* (1555); *L'horloge des princes de Guevara* (1555). He has been called the founder of the heroic romance in France.

HER'BERT. An historic British family, dating from the Norman Conquest, which has been ennobled in so many of its branches, by ancient and renewed creations, that it has become a matter of difficulty to ascertain with certainty which is the parent stem. Herbert, Count of Vermandois, who afterwards filled the post of Chamberlain under William II., is mentioned in the roll of Battle Abbey, and received from his sovereign a grant of lands in Hampshire. His wife, Emma, daughter of Stephen, Count of Blois, was a granddaughter of the Conqueror, and his son, Herbert of Winchester, was Chamberlain and Treasurer of King Henry I. In the reign of Henry V., Sir William Herbert, of Raglan Castle, County Monmouth, received the honor of knighthood in reward of his valor in the French wars. His eldest son, a stanch adherent of the House of York, was created Earl of Pembroke by Edward IV. in 1469, but fell into the hands of the Lancastrians after the battle of Danes Moor, and was beheaded the following day, when the title became extinct. It was, however, revived in 1551, in the person of his illegitimate grandson, William Herbert, one of the most influential noblemen of his age, both as a statesman and as a soldier. The fourth Earl, Lord Chamberlain to Charles I., and chancellor of the University of Oxford, was the founder of Jesus College in that seat of learning, his representative descendant being hereditary visitor. The eighth Earl held several high offices under Queen Anne, including that of Lord High Admiral. From him the present representative, Sidney, fourteenth Earl of Pembroke and Montgomery (born 1853), is directly descended. The earls of Carnarvon, more than one of whom have gained celebrity in the field of literature, descend from the eighth Earl of Pembroke, mentioned above. The present earls of Powis are descended

from the same stock maternally, the only child and heiress of the last Earl of Powis of a previous creation having married the eldest son of Robert Clive, the founder of the British Indian Empire, in whose favor the title was renewed in 1804.

HERBERT, Edward, first Lord Herbert of Cherbury (1583-1648). Commonly reckoned as the first of the English deistical writers. He was born of a noble family at Eyton-on-Severn, near Wroxeter, March 3, 1583. He was sent to Oxford in his twelfth year, and by arrangement of his relatives at sixteen married an heiress, but kept on with his studies. The marriage was happy, but there appears to have been little affection between Herbert and his wife, who was four years older than himself. In 1600 he removed to London and attracted Queen Elizabeth's notice. On the accession of James I. he was made a knight and invested with various offices. He left home for travel in France in 1608, and from this time resided very much abroad. After a brief return to his native country he set out again for the Low Countries, where he joined the arms of Maurice of Orange; he again offered him his services in 1614. After a campaign he traveled through Germany and Italy on horseback, and went as far as Venice, Florence, and Rome. On his return he got into trouble by conducting a troop of Protestant soldiers from Languedoc into Piedmont to assist the Duke of Savoy against the Spaniards (1615). He soon returned to England, and proposed to devote himself to study and philosophical inquiry; but important diplomatic duties awaited him. He was sent to France as extraordinary ambassador (1618). His aim was to promote the alliance between France and England, and he was so far successful that he was appointed ordinary ambassador, and continued to reside in Paris. He tried, but without much success, the difficult task of negotiation between Louis XIII. and his Protestant subjects, and was abruptly recalled in 1624. He was elevated first to be a peer of Ireland, and then in 1630, five years after the accession of Charles I., to be a peer of England. When the Civil War broke out he appears to have acted with hesitation, at first siding with the Parliament and then joining the King. His hereditary seat, Montgomery Castle, was attacked and burned. He died in London, August 20, 1648. The result of his religious speculations is contained in his Latin treatises, *De Religione Laici*, and *Ad Sacerdotes de Religione Laici*, issued with his *De Causis Errorum* (London, 1645); and *De Religione Gentilium* (Amsterdam, 1663; trans., *The Ancient Religion of the Gentiles and Causes of Their Error Considered*, London, 1705). Herbert's position at the fountainhead of English Deism gives them a peculiar significance. His speculations are those of a philosophical dogmatist rather than of a critical inquirer. His arguments are abstract and deductive, and not analytical or negative. He offers solutions rather than starts difficulties or obtrudes negations. His other works of general interest are: his *Life and Reign of Henry VIII.* (reprinted 1880); his *Poems* (1881); and particularly his *Autobiography*, edited by Lee, with introduction and continuation (London, 1886).

HERBERT, George (1593-1633). An English poet, brother of Lord Herbert of Cherbury, born in Montgomery Castle, Wales. He was educated at Westminster, and at Trinity College, Cambridge, graduating B.A. in 1612-13, and M.A. in 1616. In 1615 he was elected fellow, and in 1619 he was promoted to the office of public orator. He now made the acquaintance of Bacon; in the hope of preferment, he was induced to spend considerable time about the Court. On the death of James I. he studied divinity, and finally took holy orders. He married in 1629, and the next year received the rectory of Bemerton, Wiltshire. Here he lived a most saintly life. But in less than three years he died of consumption, and was buried beneath the altar of his church. While at Bemerton he wrote *The Temple, or Sacred Poems* (1633), which, though disfigured by conceits in the manner of the time, contains some of the finest sacred lyrics in our language. He also wrote a prose work, *The Country Parson* (1652), which lays down rules for the guidance of a clergyman's life, and may be considered a pendent to *The Temple*. A charming life of Herbert was written by Izaak Walton (*Life of George Herbert*, London, 1670). Consult, also: Shorthouse, reprint of *The Temple* (London, 1882); *Complete Works in Prose and Verse*, with Walton's *Life*, edited by Grosart (London, 1874); *Poems*, S. P. C. K. (ib., 1890), and *Life*, S. P. C. K. (ib., 1893).

HERBERT, Henry Howard Molyneux. See Carnarvon, fourth Earl of.

HERBERT, Henry William (1807-58). An American novelist, born in London. He studied at Eton from 1820 to 1825, graduated at Caius College, Cambridge, in 1830, emigrated to America in 1831, and for eight years taught Greek and Latin in a private school in New York City. He established in 1833 the *American Monthly Magazine*, which he edited till 1836, and contributed widely to newspapers and magazines. In 1834, under the pen-name of 'Frank Forester,' he began to write books on sports, and sketches of outdoor life, which formed a series of great usefulness and popularity. His more serious literary work included several carefully written novels, chiefly historical, and translations from the French of Eugène Sue and Dumas. The last years of his life were imbittered by domestic troubles and the estrangement of personal friends, and he died by his own hand. The most important of his novels and works on history are: *Cromwell* (1837); *Marmaduke Wyvil* (1843); *The Brothers: A Tale of the Fronde* (1844); *The Roman Traitor* (1846); *The Miller of Martigne* (1847); *The Captains of the Old World* (1851); *The Cavaliers of England* (1852); *The Chevaliers of France* (1853); *The Puritans of New England* (1853); *The Captains of the Roman Republic* (1854); and *Memoirs of Henry VIII. of England and His Six Wives* (1858). Chief among the 'Frank Forester' series are: *My Shooting Box* (1846); *Field Sports of the United States and the British Provinces of America* (1848); *The Warwick Woodlands* (1849); *Frank Forester and His Friends* (1849); *Complete Manual for Young Sportsmen* (1852); *Sporting Scenes and Characters* (1857); *Horses and Horsemanship of the United States and British Provinces* (1859). His *Poems* were published in 1887. Consult: Picton, *Frank Forester's Life and Writings* (New York, 1881), and Judd, *Life and Writings of Frank Forester* (New York, 1882).

HERBERT, Hilary Abner (1834—). An American Congressman and Secretary of the Navy. He was born at Laurensville, S. C.; was early taken by his parents to Greenville, Ala.; was educated at the University of Alabama and the University of Virginia, and adopted the profession of the law. In the Civil War he commanded the Eighth Alabama (Confederate) Regiment, and was disabled at the battle of the Wilderness in 1864. He was a member of Congress from 1877 to 1893, serving during several terms on the Committee on Naval Affairs, and hence was prominently connected with the reconstructions of the navy. From 1893 to 1897, during the second administration of President Cleveland, he was Secretary of the Navy, and subsequently practiced law in Washington. He edited *Why the Solid South? or, Reconstruction and Its Results* (1890).

HERBERT, Ivor John Caradoc (1851—). An English soldier, born at Llanarth, Monmouthshire. At nineteen he became a grenadier guardsman, and he was made a captain four years afterwards. He distinguished himself in Egypt (1882), on the Nile expedition (1884-85), and was promoted to the rank of colonel in 1889. As major-general, Herbert was at the head of the militia in Canada for five years (1890-95), and afterwards was appointed assistant adjutant-general in England.

HERBERT, John Rogers (1800-90). An English painter, born at Maldon, Essex. He was a pupil of the Royal Academy, and exhibited there in 1830; then for some years did illustrating and subject pictures. Of these, "The Appointed Hour" (1834) attracted some attention, and after several successes he went abroad. In 1840 he became a Roman Catholic, and afterwards his subjects were chiefly religious. His best works are the frescoes in the Houses of Parliament: "King Lear Disinheriting Cordelia;" and a series of subjects called "Human Justice;" "Sir Thomas More and His Daughter;" and "Saint Gregory Teaching His Chant." He was one of the masters in the School of Design in Somerset House (1841), and a Royal Academician (1846).—His son Cyril Wiseman (1847-82) became a painter of note, despite his premature death.

HERBERT, Michael Henry (1857—). An English diplomat, the son of Sidney Herbert and Lady Herbert of Lea, known as an authoress, and brother of the Earl of Pembroke. He entered the diplomatic service in 1888, was appointed chargé d'affaires at Washington, and in 1892 was secretary of the British legation there. In 1893 he was made secretary of legation at The Hague, and thereafter held successively similar positions at Constantinople (1894-97), at Rome (1897-98), and at Paris (1898-1902). In the latter year he was appointed Ambassador from Great Britain at Washington as the successor of Lord Pauncefote.

HERBERT, Sidney, first Baron Herbert of Lea (1810-61). An English administrator, second son of the eleventh Earl of Pembroke. He was born at Richmond, Surrey; was educated at Harrow School and at Oriel College, Oxford, and entered the House of Commons in 1832 as member for South Wilts, which he represented until his elevation to the peerage in 1861. He began his political career as a Conservative, and was Secretary of the Admiralty in Sir Robert Peel's Administration from 1841 to 1845, when he became Secretary for War. As a member of this Administration, it fell to him to oppose Cobden's motion for a select committee to inquire into the effect of the corn laws on farmers, and afterwards to argue in support of the free trade in corn. He went out of office with his party in 1846. In 1852 he was again Secretary for War, in the Aberdeen Ministry, and the sufferings of the army before Sebastopol were laid in a great degree at his door. He was for a few weeks Colonial Secretary in the first Administration of Lord Palmerston in 1855, and Secretary for War in his second Administration in 1859. Great improvements in the sanitary condition and education of the army, the amalgamation of the Indian with the royal army, and the organization of the volunteer force, signalized his army administration. He largely reformed the War Office, and was devoting himself with equal zeal and intelligence to his Ministerial duties, when, owing to failing health, he resigned his seat in the House of Commons, and in 1860 was called to the Upper House, under the title of Baron Herbert of Lea.

HERBERT, Sir Thomas (1606-82). An English traveler and author, born at York, and educated at Oxford and possibly at Cambridge. When he was twenty-one he set out to Persia with Sir Dodmore Cotton, Ambassador to the Persian King. With letters of safe conduct from Court, Herbert traveled through Persia, and made important explorations on his way home. Siding with Parliament in the Civil War, he was commissioned to treat for the surrender of Oxford, and in 1647 was given charge of Charles, whose personality won him to the royal cause. Herbert was the King's constant and sole attendant during his last days, and accompanied him to his execution. He was created a baronet after the Restoration. Among his publications are narratives of his travels: *A Description of the Persian Monarchy* (1634), and *Some Yeares Travels into Divers Parts of Asia and Afrique* (1638; including the former work); and the Royalist *Threnodia Carolina* (1678; and, 1702, under the title *Memoirs of the Last Two Years of the Reign of that Unparallell'd Prince of Very Blessed Memory, King Charles I.*).

HERBERT, Victor (1859—). An Irish-American bandmaster, orchestra conductor, and composer, born at Dublin, Ireland, and a grandson of the famous novelist, Samuel Lover. He was surrounded by musical influences from earliest childhood, and at seven years of age was studying music in Germany, in which country he received his musical education. Although trained in the entire range of music, he perfected himself on the 'cello, and secured his first important engagement as the first 'cellist of the Court Orchestra at Stuttgart, which, after an interval spent on tour, was followed in 1886 by a similar position with the Metropolitan Orchestra of New York. He afterwards played under Thomas, and later Seidl, acting under the latter in the double capacity of 'cellist and associate conductor. When the successor of Gilmore in the famous New York Twenty-second Regiment Band resigned, and a leader was required to keep up the high reputation of the organization, he was chosen conductor. He was soon after engaged to conduct the Pitts-

burg Orchestra. Meanwhile he had been equally busy with his pen, and had published several compositions, chiefly instrumental. Among his comic operas are: *Prince Ananias* (1894); *The Wizard of the Nile* (1895); *The Serenade* (1897); and *The Idol's Eye* (1897). He is also the composer of an oratorio, *The Captive,* written for the Worcester (Mass.) festival.

HER'BICIDE (from Lat. *herba,* herb + *cædere,* to kill). A name applied to any substance used to destroy weeds. Of the various chemicals that have been successfully and inexpensively employed in weed destruction, dilute solution of carbolic acid, strong brine, copper-sulphate solutions, arsenic, sal soda, arsenate of soda, kerosene, etc., have been most extensively used upon walks, drives, courts, etc., in the destruction of dandelions, plantain, knotweed, ragweed, and various grasses. For best results, salt should be applied dry. At the rate of 3000 pounds of crude salt per acre, meadows can be freed from the orange hawkweed, a plant that resists all other methods of destruction. The interesting discovery has been made that some weeds, such as charlock, penny cress, wild radish, shepherd's purse, etc., may be destroyed without permanently injuring the crops among which they grow, by spraying the fields with a solution of copper sulphate (blue stone) at the rate of 40 gallons per acre. The most satisfactory strength of solution to use has been found to be one pound of copper sulphate to four gallons of water. The spraying should be made on a calm bright day, when the weeds have attained only three or four leaves. If the solution be well applied the weeds will be killed. Iron sulphate (copperas) may be substituted for the blue stone, but then a stronger solution is required, viz. one pound of the salt to a gallon of water. This treatment has been repeatedly tried in England, France, Germany, and the United States with great success. If rain falls soon after the spraying is done, or if the plants have been allowed to become too old, a second application should follow the first within a week or ten days. Young clover growing in the cereals will not be injured by the treatment.

HERBIV'ORA (Neo-Lat. nom. pl., from Lat. *herba,* herb + *vorare,* to eat). A term in the old classifications, variously defined and limited, which designated herbivorous as contrasted with carnivorous animals, but ordinarily referred to such as grazed. The term long ago ceased to have any exact significance in science.

HER'BORT VON FRITZ'LAR. A German poet of the twelfth and thirteenth centuries, so called from his residence at Fritzlar in Hesse. He was somewhat read in the classics, and was probably in orders. He wrote the *Liet von Troie,* a poetic version of the Trojan War, and the oldest extant German work on that subject, based closely on the *Roman de Troie* of Benoit de Sainte More. The work is in the four-stressed rhyming distich. The language is decidedly Middle German, and mistranslations of the original are not infrequent. There are some worthy passages, such as the address of Achilles to the dead Hector. Perhaps Herbort von Fritzlar is to be identified with a Herbort who appears as the author of a drama, now lost, on Saint Otto.

HERB ROBERT. A common weed. See GERANIUM.

HERBS, CULINARY. Aromatic plants used in the preparation of viands. The plants popularly employed owe their flavoring properties to volatile oils which in most instances are derived from the leaves, either fresh or cured; in other cases, for example, dill and caraway, the seed is utilized. In Europe these plants are essential adjuncts of the cuisine, especially of France, where the ethereal flavors of such plants as fennel, basil, and balm are sought, and of Germany and England, where preference is given to more pronounced flavors, such as dill, sage, and mint. In America, few herbs are known beyond the confines of the larger cities, where the foreigners are slowly educating their neighbors in the uses of these plants. Uses they certainly have, in rendering certain inert salads and the too often tasteless 'made-over' dishes not merely palatable, but delicious.

The kinds most commonly employed in America are parsley, sage, thyme, marjoram, and savory (qq.v.). Each of these may be grown from seed, either in the garden or in boxes of good soil on a sunny window-sill. No special care is necessary, except to remove weeds and to keep the surface of the soil loose. When well established, the leaves may be gathered without injury to the plants; indeed, the yield may be increased by judicious removal of the tips of the shoots, or, in the case of parsley, of the individual leaves when they have attained the very dark green stage. The leaves should be gathered just when the flower-buds appear, and preferably immediately after the dew has disappeared in the morning, because the plants then contain the most oil. By spreading the leaves thinly upon trays in a heat not exceeding 120°, and occasionally turning them, they will soon be dry enough to pulverize, an operation generally performed by rubbing between the hands. The powder will keep best in air-tight jars, poorest in paper or pasteboard packages, because the paper absorbs the oil and permits its escape into the air. Herbs may also be preserved in alcohol or vinegar. When this method is employed a jar is filled with leaves and liquid enough poured over to cover them completely. After standing a few days the liquor will be ready for use. Dried herbs are generally used where the presence of specks is not objectionable, as in dressings, stews, soups, etc.; infusions in clear sauces, and the fresh herbs in salads. In general, sage is regarded as the proper flavoring ingredient in dressings with goose, duck, pork, and other rich meats; parsley, savory, fennel, balm, and marjoram, either singly or mixed, in dressings with turkey, chicken, veal, and similar delicate meats. Tarragon is perhaps most used in sauces with boiled fish, spearmint with spring lamb, dill with cucumber pickles. Individual taste, however, has much to do with the kind and quantity used and with what kinds of food.

HERBST, hĕrpst, EDUARD (1820-92). An Austrian politician, born in Vienna. He was elected a Deputy to the Bohemian Diet, and then, in accordance with the February patent of 1861, was elected by the Diet to the Lower House in the Austrian Reichsrat, where he became one of the most conspicuous leaders of the German Liberal or Constitutional Party. In 1867 he was appointed Minister of Justice in the Liberal Cabinet (Bürgerministerium) of Prince Carlos Auersperg. As such he introduced a number of im-

portant reforms, among them the abolition of imprisonment for debt; the introduction of the jury in libel suits against the press; the organization of the district courts; and, above all, the confessional ordinances of 1868. In 1870 his party lost its control of the Government, and he led the opposition in the Reichsrat in its attacks on the Ministries of Potocki and Hohenwart, until the fall of the latter in October, 1871, brought the German Constitutional Party once more into power, when he became a leader of the Government forces in the Lower House. In the latter years of his life, during the Taaffe régime, Herbst lost much of his former influence. Among his writings may be mentioned his *Handbuch des österreichischen Strafrechts* (7th ed. 1882-84).

HERCHER, hēr'kĕr, RUDOLF (1821-78). A German Hellenist. He was born at Rudolstadt, and after studying at Jena, Leipzig, and Berlin, was appointed to a professorship at the Joachimsthal Gymnasium in Berlin (1861). In 1873 he was made a member of the Berlin Academy of Sciences. His works, which are distinguished by critical accuracy, include editions of *De Fluvii* (1851), which he proved had not been written by Plutarch; Arrian's *Scripta Minora* (1854, 2d ed. by Eberhard, 1885); *Scriptores Erotici Græci* (2 vols., 1858-59); *Ælian* (1858); the *Oneirocritica* of Artemidorus (1864); Plutarch's *Moralia* (vol. i. 1872); the *Epistolagraphi Græci* (1873); and Apollodorus's *Bibliotheca* (1874). His *Homerische Aufsätze* on the topography of Ithaca were collected by C. Robert (1881).

HERCULANEUM, hēr'kū-lā'nē-ŭm (Lat., from Gk. Ἡράκλειον, *Hērakleion*, city of Hercules, from Ἡρακλῆς, *Hēraklēs*, Hercules). An ancient city of Italy, situated at the northwestern base of Mount Vesuvius, about five miles east of Naples. It was doubtless founded by Oscans, but Etruscans seem to have gained a foothold there. It subsequently was conquered, with all the rest of Campania, by the Samnites, and later it fell into the hands of the Romans. In A.D. 63 the city was seriously injured by a violent earthquake; and in 79 it was buried, along with Pompeii and Stabiæ, by the memorable eruption of Vesuvius (q.v.). It now lies at a depth of from 30 to 120 feet below the surface, owing to successive eruptions of later days, and is filled up and covered with volcanic tufa, composed of *lapilli* and ashes, and consolidated to some extent by water, which is often thrown up in great quantities during volcanic eruptions. Above it, on the modern surface, are the two large villages Portici and Resina. The very existence of Pompeii had been forgotten, but the knowledge had never been lost of the burial-place of Herculaneum. Finally, in 1719, an Austrian general, Count Elbeuf, sank a shaft which fortunately struck the ancient theatre, from which centre some tunneling was done, and objects of interest discovered. But after a short time the Government stopped the work till 1738, when explorations were begun under royal authority. From that time excavations have been carried on intermittently, being more difficult than in Pompeii. For the greater part of the city lies deep under the modern villages, and work must be done by tunneling through a troublesome tufa, which needs constant support lest the vaults collapse, and with them the foundations of the houses above. Hence visitors can see only a very small portion of this entombed city. The chief edifice shown is the theatre, which was very large, and was built but a short time before the fatal eruption. It has 16 rows of stone seats, and could accommodate about 3000 persons. A part of the Forum, with adjacent buildings, some private houses, two small temples, and a villa have also been discovered; and from these buildings many beautiful statues and remarkable paintings have been obtained. The art relics of Herculaneum far exceed in value and interest those found at Pompeii. Most remarkable was the discovery in the villa of nearly two thousand rolls of manuscript on papyrus, charred into a coal-like condition by their long burial under moist earth. Some of these have been deftly unrolled by a delicate process invented for the purpose, and their contents (philosophical treatises) deciphered. These treasures, together with such vases and domestic implements as have been found, have been conveyed to the museum at Naples. Latterly, the portion of Herculaneum toward the sea, which had been covered only by loose ashes, has been laid open, and ancient buildings may now be seen there. Consult: Ruggiero, *Storia degli scavi di Ercolano* (Naples, 1885); Comparetti and De Petra, *La villa ercolanese dei Pisoni* (Turin, 1883); Furchheim, *Bibliografia di Pompei, Ercolano e Stabia* (Naples, 1891).

HERCULANO, ār'kōō-lä'no, ALEXANDRE DE CARVALHO E ARAUJO (1810-77). A Portuguese poet and historian, born in Lisbon. In 1828, to escape the despotism of Dom Miguel, he went to Paris, and two years afterwards to London. In 1832 he returned to Lisbon, joined the Liberal Party, and gained much fame as an editor of *Panorama*. His *Poesias* (1850), including *A voz do propheta* and *A harpa do crente*, the latter of religious and political importance, were followed by the historical novels: *Enrico, o Presbytero* (1847); *O monge de Cister* (1848); *O Bobo;* and *Lendas e narrativas* (1851). In 1845, as librarian at Ajuda, he began his historical work. The *Historia de Portugal* (1846-53) is an authority on Portuguese history to the end of the thirteenth century; equally important are: *Da origem e estabelecimento da inquisição em Portugal* (1854-55); *Questões publicas* (1873); and *Controversias e estudos historicos* (1876-84). As a member of the Lisbon Academy, Herculano edited *Portugaliæ Monumenta Historica*. Consult Pimentel, *Herculano e o seu tempo* (Lisbon, 1881).

HER'CULES (Gk. Ἡρακλῆς, *Hēraklēs*, also known at Thebes as Ἀλκαῖος, *Alkaios*, and frequently in literature called Ἀλκείδης, *Alkeidēs*, or Alcides; Lat. *Hercules*). The typical hero of Greek myth, and the subject of numberless legends. In general, these may be conveniently treated in three groups, centring about Thebes, Argos, and Mount Œta, near Thermopylæ, and corresponding to the birth, middle life, and death of the hero. Thebes seems to have been generally recognized as the birthplace of Hercules, and Amphitryon, the husband of Alcmene, is certainly a Bœotian hero; but when Argos had become the centre of his life it was necessary to connect his parents with that region, and so both Alcmene and Amphitryon become descendants of Perseus, and are represented as exiles from Tiryns, living at Thebes. According to the common story, during the absence of Amphitryon, Zeus came to Alc-

mene in her husband's form, and by him she became the mother of Hercules, while by Amphitryon she conceived his twin brother Iphicles. The jealous Hera, throughout his life the enemy of Hercules, sent two serpents to destroy the infants in their cradle; but the hero, who had been gifted by Zeus with superhuman strength, strangled them. Thebes is also the scene of the madness of Hercules, immortalized by Euripides in his play, *The Man Hercules*. In this fit he killed his children, and in some versions his wife, Megara, and was ordered by the Delphic oracle to expiate his crime by serving Eurystheus, King of Argos or Mycenæ. This feature seems much like an addition to bring the Theban hero into Argolis, and it is quite probable that the original Theban legend contained many exploits afterwards transferred to Peloponnesus. The killing of the lion of Mount Cithæron can scarcely be other than a variant of the first labor. At Argos the central feature is the servitude to Eurystheus, to which Hercules was bound even before his birth by a trick of Hera. To this servitude belongs a series of 'labors,' which were gradually fixed into a canon of twelve. The exact date when this was brought about is uncertain. It can scarcely be due to an early epic, for even in the fifth and fourth centuries there is no hard and fast line between the 'labors' and the other deeds, and the final classification appears first for us in the mythographers of Alexandria, who also arranged the *parerga*, or other deeds attributed to the hero in appropriate places in the cycle. Traces of an earlier cycle of ten labors are perhaps to be found in the story that, because in the second Hercules had the aid of Iolaus, and in the fifth concealed from Augeas that he was performing the command of Eurystheus, the latter refused to count these and required the performance of the eleventh and twelfth.

The first labor was to destroy the lion which haunted the forests of Nemea and Cleonæ and could not be wounded by the arrows of a mortal. Hercules boldly attacked him with his club, but in vain, and he was finally obliged to strangle him with his hands. From this time he wore the lion's skin as armor. The second was to destroy the Lernæan hydra with its many heads, which he accomplished with the assistance of his friend Iolaus. His third was to catch the Arcadian hind of Diana, famous for its swiftness, its golden horns, and its brazen feet. The fourth was to bring alive to Eurystheus a wild boar, which ravaged the neighborhood of Erymanthus. The fifth was to cleanse the stables of Augeas, King of Elis, where 3000 oxen had been confined for many years, a task which he accomplished in one day, by turning the river Alpheus or Peneus through the stables. His sixth was to destroy the carnivorous birds, with brazen wings, beaks, and claws, which ravaged the country near the Lake Stymphalus, in Arcadia. The seventh was to bring alive to Peloponnesus a bull, remarkable for his beauty and strength, which Poseidon had, upon his request, given to Minos, King of Crete, in order that he might sacrifice it. This, however, Minos afterwards refusing to do, Poseidon made the bull mad, and it laid waste the island. Hercules brought the bull on his shoulders to Eurystheus, who set it at liberty. It appears again as the Marathonian bull in the story of Theseus. The eighth labor was to obtain the mares of Diomedes, King of the Bistones in Thrace, which fed upon human flesh. The ninth was to bring the girdle of Hippolyta, Queen of the Amazons. The tenth labor was to kill the triple-bodied monster Geryon and bring his herds to Argos. The eleventh was to obtain the golden apples from the garden of the Hesperides. Atlas, who knew where to find the apples, brought them to Hercules, who meanwhile supported the vault of heaven; but according to others, Hercules went himself and stole the apples, after slaying the dragon who guarded them. The last labor was to bring from the infernal regions the three-headed dog Cerberus. Hades promised him Cerberus on condition that he should not employ arms, but only force. When Hercules had brought the monster to Eurystheus, the latter, pale with fright, commanded him to be removed. Hercules set him at liberty, whereupon Cerberus immediately sank into the earth. Hercules was now free from his state of servitude.

Into the cycle of 'labors' are wrought many of the *parerga* performed by Hercules in his wanderings. Thus the battle with the centaurs, a favorite subject in archaic art, was localized at Pholoe in Arcadia, and connected with the chase of the Erymanthian boar. On his journey to Thrace for the horses of Diomedes he was entertained by Admetus, and, after wrestling with Death, restored to him from the grave his wife, Alcestis. The tenth and eleventh labors, with their long journeys, gave opportunity for many scenes. The hero voyages toward the western home of Geryon in a bowl given him by the Sun, and on his return through Italy kills the robber Cacus, who stole his cattle, and dedicates the *Ara Maxima* at Rome. While in search of the apples of the Hesperides, he wrestles with Nereus, the Old Man of the Sea, slays in Libya the giant Antæus, by his strength escapes from the Egyptian King, Busiris, who seeks to offer him as a sacrifice, and frees Prometheus from his captivity. He frees from Hades the captive Theseus. During the period of freedom from Eurystheus we find that Hercules made one of the Argonauts, and engaged in an expedition against Troy, because after freeing Hesione from a sea monster her father, Laomedon, had refused him his reward. In this period was also placed another fit of madness, in which he killed his friend Iphitus, and was in consequence required to serve the Lydian Queen, Omphale.

The legends that cluster about Mount Œta are concerned with the death of the hero. He had won Deianira, daughter of Œneus of Calydon, by overcoming his rival, the river god Acheloüs. With her he now repaired to Trachis. Having arrived at the river Evenus, he encountered the centaur Nessus. Hercules passed through on foot; but Nessus, under pretense of carrying Deianira over, attempted to offer her violence, whereupon Hercules slew him with an arrow dipped in the poison of the Lernæan hydra. Nessus, before expiring, instructed Deianira that a robe dipped in his blood would prove an infallible philter to regain her husband's love. The hero now made war against Eurytus, King of Œchalia (who had defrauded him), slew him and his sons, and carried off his daughter Iole. Thence he went to Cenæon, in Eubœa, and erected an altar to Zeus Cenæos. In order to celebrate the rite with due solemnity, he sent Lichas to Trachis for a white garment. Deianira, being

jealous of Iole, anointed the robe with the philter she had received from Nessus. Hercules put it on, and immediately the poison penetrated his bones. Maddened by the terrible pain, he seized Lichas by the feet and flung him into the sea. He tore off the dress, but it stuck to his flesh, which was thus torn from his bones. In this condition Hercules was conveyed by sea to Trachis, and Deianira, being informed of what had occurred, destroyed herself. Hercules himself repaired to Mount Œta, where he erected a funeral pile, and, ascending it, commanded that it should be set on fire. The burning pile was suddenly surrounded by a dark cloud, in which, amid thunder and lightning, Hercules was carried up to heaven. There he became reconciled to Hera, and married Hebe.

Popular legend represented the great, patient, suffering hero as fond of good cheer and relaxation in his hours of rest, and thus in the comedy of Attica and Magna Græcia Hercules was frequently introduced as a jovial sensualist, whose intellectual powers are by no means equal to his physical.

In Greek art, from the earliest times Hercules is a favorite figure. His labors adorned the metopes of the Temple of Zeus at Olympia and the treasury of the Athenians at Delphi. His statues are numerous. Scopas seems to have represented him in youthful vigor, but in the Hellenistic period the type is that of a bearded man, of athletic build, often with the muscular development carried to excess, as in the Farnese Hercules of Glycon, which perhaps is based on a work of Lysippus.

As to the nature and origin of Hercules, there has naturally been the widest diversity of opinion. Some, following the later Greek identifications with the Phœnician Melqart, and the resemblances to the Babylonian hero Gilgames, have seen only a Semitic deity adopted by the Greeks. Others again have considered him a solar hero. It seems clear that the story of Hercules in its earliest features is pure Greek; the Oriental elements are, to judge from our sources, later accretions. Whether the hero or the god is the original form is, however, still matter for debate. E. Meyer (*Geschichte des Alterthums*, ii., Halle, 1894) has pointed out that Attica, Bœotia, and the Achæan colonies are the seat of the divine worship of Hercules, and insists that he is originally a nature deity, who, like many others, partakes of the changes of nature, now triumphant, now suffering, and that under the Dorian influence, and especially literary tradition, the god sank to the hero. On the other hand, U. von Wilamowitz-Möllendorff holds that in Hercules we have the perfect ideal of the Dorian man, who became a divinity to the tribes with whom the Dorians were in contact. Much can be said in favor of both views, and a positive decision between them is not as yet attainable; but it must be admitted that the degradation of a god to a hero seems common in the development of Greek mythology, while the reverse is by no means so clearly proved a process. Consult: Wilamowitz-Möllendorff, *Euripides's Herakles* (2d ed., Berlin, 1895); Furtwängler and Peters, in Roscher, *Lexikon der griechischen und römischen Mythologie* (Leipzig, 1884-97); and Dunbach, in Daremberg and Saglio, *Dictionnaire des antiquités* (Paris, 1892).

HERCULES, PILLARS OF (Gk., αἱ Ἡρακλέους στῆλαι, *hai Herakleous stēlai*, Lat., *Herculis Columnæ*). The name given by the ancients to the two rocks forming the entrance to the Mediterranean at the Strait of Gibraltar, Calpe (Gibraltar) in Europe and Abyla (Ceuta) in Africa. Their erection was generally ascribed by the Greeks to Hercules, on the occasion of his journey to the Kingdom of Geryon. According to one version of the story, they had once been united, but Hercules tore them asunder, to admit the flow of the ocean into the Mediterranean; another version represents him as causing them to unite temporarily, in order to form a bridge. The first author who mentions them is Pindar, who seems to connect them with Cadiz, and in later times there was much discussion as to their exact location, and especially as to whether they were to be identified with the promontories at the straits, or to be sought in islands, or were pillars erected by Hercules.

HERCULES AND STAG. An antique bronze sculpture in the Museo Nazionale, Palermo, Sicily, representing the lithe and youthful god grasping a stag by the horn and bearing it down to the earth. It was found at Pompeii.

HERCULES BEETLE. A scarabid beetle (*Dynastes Hercules*), remarkable not only for its great size (five inches long), but for the singular appearance of the male. An enormous

HERCULES BEETLE.
m, male, *f*, female

horn projects from the head, and is opposed by a similar but smaller projection of the thorax, the whole resembling a pair of great but unequal pincers. It is a native of Brazil. Two species occur in the United States. *Dynastes tityrus* is a large greenish-gray species of the Southern States; *Dynastes Granti*, of the far West, has a much larger thoracic horn than the former. Compare GOLIATH BEETLE.

HERCULES'S CLUB, ANGELICA TREE. See ZANTHOXYLUM.

HERCULES'S CLUB GOURD. See BOTTLE GOURD.

HERCULES STRANGLING THE SERPENTS. A mythological painting by Sir Joshua

Reynolds (1788), and one of his best works. It represents the god, still a child, choking with miraculous strength two serpents which have attacked him; while Alcmene and her attendants rush to his rescue and Juno appears above him in a cloud. The painting, which hangs in the Hermitage Museum at Saint Petersburg, was ordered by Catharine II. of Russia, who saw in the subject a symbol of her country's early struggles for life.

HERCYN'IAN FOREST (Lat. *hercynia silva*). A name variously applied by the ancient writers to portions of the central mountain system of Europe. Aristotle makes the Ister (or Danube) and the other great northern rivers take their rise in the Hercynian Forest. Cæsar, who estimates it at nine days' journey in breadth and sixty in length, comprehends under this name a great part of the mountain ranges in Germany north of the Danube; while some identify it with the Bohemian Forest, and others with the Thuringian Forest. Some geographers apply the term to the complex of mountain ranges, mountain groups, and plateaus which stretch from Westphalia across Middle Germany and along the northern borders of Austria to the Carpathians.

HERD, DAVID (1732-1810). A Scotch collector of national ballads. He was born in the Parish of Marykirk, Kincardine, where his father had a farm, but early left the country for the town and became a well-known figure among the literary men of Edinburgh. His claim to remembrance rests upon his *Ancient and Modern Scottish Songs, Heroic Ballads, etc.* (2 vols., 1776), of which a modern edition was published in Glasgow in 1869.

HERDER, hĕr'dĕr, BARTHOLOMÄUS (1774-1839). A German publisher, born at Rottweil, in Württemberg. In 1801 he opened a bookstore and printing-office in Meersburg, on Lake Constance, but soon afterwards removed to the city of Constance, and in 1810 to Freiburg, Baden, where he opened the Herdersche Universitätsbuchhandlung. He accompanied the Allies to Paris in 1814 as Imperial field printer in Metternich's suite, and on his return added to his printing business establishments for lithography, copper-engraving, and plastic art. The Catholic character of the firm was developed under his sons and successors, Karl Raphael Herder and Benjamin Herder, and it became one of the best-known publishing houses of this Church in Germany. In 1888 Hermann Herder, a son of Benjamin and grandson of the founder, inherited the business, which became known as the Herdersche Verlagshandlung. The firm also established an office at Saint Louis, Mo., U. S. A. Among the important works which the firm has published is *Wetzer und Welte's Kirchenlexikon oder Encyklopädie der katholischen Theologie* (12 vols., 1847-56; 2d ed. 1882-1901).

HERDER, JOHANN GOTTFRIED VON (1744-1803). An eminent German philosophical and critical writer, of the classical period, born at Mohrungen. He was the son of a schoolmaster and cantor. His frail health unfitted him for industrial life, and his first earnings were as copyist to Deacon Trescho, a voluminous but forgotten author. Here he was neither appreciated nor justly treated, but he gained a knowledge of books and an easy style. He had begun independent composition when he awakened the interest of a Prussian surgeon, with whom he went to Königsberg, where he hoped to have an operation performed on an eye, and then to study medicine. But for the latter his nerves proved too weak, and he turned to theology, getting a small scholarship and eking out a livelihood by teaching. He soon won notice both as pedagogue and preacher, and became intimate with Kant, the philosopher, who, with Rousseau, was the guide of his future metaphysical speculations. In 1764 he accepted a call to the Cathedral School at Riga, where he maintained his reputation, and would have remained had he not become involved in a literary controversy with Klotz about Lessing, in the course of which he was led to protest that he had not written articles that universal opinion, supported by circumstantial evidence, held that he had. Thus he lost reputation, and resolved to recruit his health in the south of France in 1769. He returned to Germany in that year. He became tutor to the Prince of Holstein-Eutin, sharpened his critical genius in a fortnight with Lessing at Hamburg, found at Darmstadt his future congenial mate in Karoline Flachsland, and accepted a call to the pastorate of Bückeburg. He went thither in 1771, after a long stay in Strassburg for optical treatment, during which he was a helpful friend and critic of the young Goethe. He had printed the famous critical attacks on the artificial literary spirit of his time, *Fragmente über die neuere deutsche Litteratur* (1767) and the *Kritische Wälder* (1769), and a prize essay, *Ueber den Ursprung der Sprache* (1772). He now began to gather material for the *Ideen zur Philosophie der Geschichte der Menschheit*, his greatest work, though unfinished, published 1784-91 (translated by Churchill), for *Aelteste Urkunde des Menschengeschlechts* (1774), an æsthetic study of Genesis, and for the studies in popular poetry (*Volkslieder*, 1778-79), the works that were to constitute his chief title to fame. In 1773 he married. In 1776 Goethe procured for him the posts of Court preacher and member of the Upper Consistory at Weimar, where he found the environment best suited to his delicately organized genius and labored effectively for Church reform, though he soon found himself in moral estrangement from Goethe and his associates. Many of Herder's important publications were completed in the period between 1778 and his journey to Italy in 1788. They consist of theological, æsthetic, philosophic, philologic, and political studies, of *Vom Geiste der Ebräischen Poesie* (1782), translated by Marsh (*The Spirit of Hebrew Poetry*, 1833), of a translation of *The Cid* (1805), and of *Stimmen der Völker* (Voices of the Peoples) (1778-80), in which he translated the popular songs of many nations with a felicity and sympathy that preserve in wonderful degree the local color and feeling. Herder's original work in æsthetics, philosophy, literature, and philology has powerfully influenced German thought. He was possibly best as an interpreter of others; for he had a truer perception of the relation of language to human nature and national character than any other of his day. He was thought, if not a systematic a most stimulating thinker, perhaps more a seer than a scholar, yet by the scope of his intuitional perceptions he abounded in suggestions that have borne fruit in the modern correlation of the sciences. Herder's *Works* are in 60 vols. (1827-30). The literary portion has been best reëdited by Suphan and

Redlich (9 vols., Berlin, 1884 et seq.). For Herder's biography, consult his widow's *Erinnerungen aus dem Leben Johannis Gottfried von Herders* (Stuttgart, 1830); his sons, *Lebensbild* (Erlangen, 1846-47); and his *Letters* (ib., 1846-48). There are *Lives* by Haym (Berlin, 1880-85); Kühnemann (Munich, 1894); and in English by Nevinson (London, 1884).

HERD'S GRASS. See REDTOP GRASS.

HÉRÉDIA, ā'rā'de'ä', JOSÉ DE (1842—). A French poet, of Spanish parentage, born at Santiago de Cuba. He was the most talented disciple of Leconte de Lisle (q.v.). His sonnets are the supreme result of the cultivation of form that the French call 'Parnassian,' very picturesque and as impersonal as lyric poetry can be. Leconte de Lisle was not quite impassive in his pessimism, but in Hérédia's work one perceives of the author only the expansion of the heart toward beauty and heroism. The immediate response of the public to the fifty sonnets of *Les trophées* (1893) was significant of the revival of stricter classical taste in a reaction against the fantastic license of the Symbolists and the followers of Baudelaire (q.v.). Hérédia's poems resemble Gautier's in polish. They show the reticences of the conscious artist, and a vague suggestion of the subjective. He is the most condensed, plastic, and precise stylist of modern France—rich in suggestions of color and melody, incomparable in the union of sonorousness and compression. His subjects reflect in the main the scenes and traditions of his youth at Havana rather than those of his later studies at the Ecole des Chartes. The heroic epoch of Spanish conquest is his most inspiring theme, and he uses it also in his sole picaroon prose romance, *La nonne Alferez* (1894), and in a translation of Bernal Diaz's *Chronicle*. But he is often superb in merely exotic description, as in the brilliancy of *Récif de corail* or the splendor of *Blason céleste*. Hérédia was elected a member of the French Academy in 1894. There is a translation of the sonnets into English blank verse in Frank Sewall's *The Trophies* (Boston, 1900.)

HEREDIA Y CAMPUZANO, ā käm-pōō-zä' nō, JOSÉ MARÍA DE (1803-39). A Cuban lyric poet, born in Santiago de Cuba, December 31, 1803, His father and mother were from Santo Domingo. Very early Heredia was taken to Florida, then to Santo Domingo, and in 1812 to Venezuela. At the age of ten he began to study philosophy in Caràcas, whence he went to Mexico. Thence he went to the University of Havana in 1817. Heredia had scarcely become a lawyer when he was arrested for conspiracy against Spain and banished from Cuba (1823). He now lived in the United States for two years, making a scanty livelihood by his poems and by giving lessons in Castilian. We next find him in Mexico, whither he had been called by Guadalupe Victoria. Heredia held in Mexico various offices both legal and educational. In 1827 he married a Mexican, Jaida Yáñez. After thirteen years of banishment Heredia sought and obtained permission to visit his mother and sisters at Matanzas. Three months later he had to leave them. Heredia died at Toluca, Mexico, May 12, 1839. Though he is much less gifted than his cousin, the French sonnetist, José de Hérédia (q.v.), this poet is well worth reading, because he is the first of the Cuban poets of the patriotic group. Heredia's Spanish is remarkably pure. His verses are often rhetorical, sometimes crude, and one is continually impressed by the weakness and the vanity of their author; nor is there ever any great power in Heredia's reasoning, but his verses are often imaginative and they reflect the melancholy of exile. Their tropical coloring initiated a brilliant epoch in the poetry of Cuba, not only making his name widely popular in all Spanish-speaking countries, but also causing his poems to be translated into the principal tongues of the civilized world. The foremost Spanish critics, as well as distinguished French and English writers, among them Longfellow, paid high tribute to the lyrical productions of the Cuban poet. They passed through numerous editions. Of especial interest to the American reader is the admirable ode "Al Niágara," translated into many languages. Besides rendering into Spanish verse several dramas by famous French and Italian authors, such as Voltaire, Chénier, Alfieri and others, he published, in 1830-31, *Lecciones de historia universal*, a work distinguished by lucidity of style and profundity of ideas, entitling its author to an honorable place among Latin-American historians. Consult: The biographies by Cánovas de Castillo (Madrid, 1853), and Bello (London, 1857); Tórres Caicedo, *Ensayos biográficos*, I. (Paris, 1863); the *Obras poéticas de Don José María de Heredia*, ed. of Nestor Ponce de Leon (New York, 1875); *Poesías líricas con prólogo de Elías Zerdo* (Paris, 1893); and Hills, *Bardos Cubanos* (Boston, 1902).

HER'EDIT'AMENT (ML. *hereditamentum*, from Lat. *hereditare*, to inherit, from *heres*, heir). In English law, a comprehensive term including everything that goes to the heir-at-law. Hereditaments are regularly classified as corporeal and incorporeal. A house or land held in freehold is a corporeal hereditament; while tithes, advowsons, profits *à prendre*, and even future estates in land are incorporeal, being dealt with, in our legal system, as impalpable rights enjoyed in corporeal things. The term most frequently appears in the phrase 'lands, tenements, and hereditaments,' technically used by Blackstone and other common-law writers to denote every species of real property. Hereditaments is the most comprehensive term of the three, as it includes not only lands, but incorporeal interests, such as those above referred to, and not only tenements, but such things as heirlooms (q.v.). On the other hand, it does not include interests in lands, such as leasehold estates and life estates, which do not descend to the heir. See HEIR; REAL PROPERTY.

HEREDITY (Fr. *hérédité*, from Lat. *hereditas*, inheritance, from *heres*, heir). The phenomenon of correlation in the deviations of blood relatives from the mean. No two individuals are alike; by marshaling in a series a large number of individuals of a species we shall find it possible to recognize a typical or middle condition of each organ or quality. From this typical conditon called the mode, the organs or qualities of most individuals deviate to a certain extent. Thus, if stature be the quality in question, we shall find that adult males of the United States have a modal stature of, say, 67 inches. Then a person whose stature is 70 inches deviates 3 inches from the mode in a + direction. According to heredity, his close relatives will, on the average, deviate in this same direction, and will

deviate from the mode to an extent which can be predicted, or which we may hope some day to be able to predict. The subject will here be treated under the following heads: (1) The classes of heredity; (2) the mathematical laws of normal inheritance; (3) special cases of inheritance not following the normal law, and (4) the limits of inheritance.

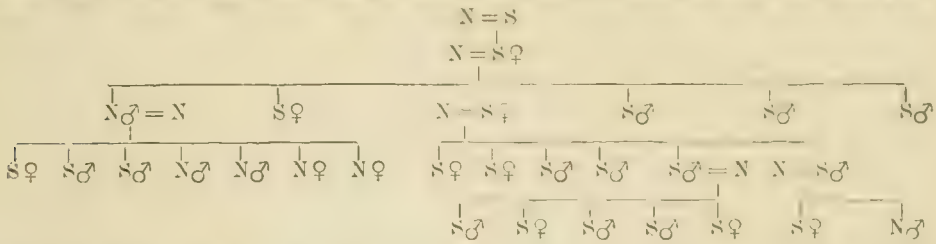
(1) Classes of Heredity. Heredity deals, as we have seen, with the qualities of organisms and their parts. Now there are, in the case of two parents and their offspring, four general methods of inheritance of qualities: (*a*) The qualities of the parents may blend in the offspring. This case of *blending heritage* is illustrated by human stature. Let us imagine the wholly supposable case of a family of children all of whose maternal ancestors for five generations back had been two inches taller than the mode of females, and all of whose paternal ancestors had been four inches taller than the mode of males; then the stature of the male offspring or of the female offspring would be found close to three inches above the mode of male or female stature, as the case might be. The tendencies in the two parents have precisely blended, and the offspring are intermediate. Another illustration of blending heritage is skin-color in man. The mulatto is a half tint, the quadroon a fourth tint, and so on. (*b*) The quality may be inherited from one parent wholly, and not at all from the other parent. This case is known as *alternative heritage*. This sort of inheritance is illustrated by human eye-color. Galton (*Natural Inheritance*, p. 139) says: "If one parent has a light eye-color and the other a dark eye-color, some of the children will, as a rule, be light and the rest dark; they will seldom be medium eye-colored, like the children of medium eye-colored parents." Cases of alternative heritage have also been described for plant hybrids. Alternative heritage is exhibited in the hair-color of some mammals. For when a white and yellow mouse are crossed, some of the offspring may be pure white (albinos), like the one parent, and the others may be yellow, like the other parent, with no sign of the yellow becoming lighter. (*c*) In one part of the body the quality may be exactly like that of one parent; in another part, exactly like that of the other parent; in other words, there may be a patchwork intermingling of parental qualities. This case is known as *particulate inheritance*. Particulate inheritance is common in hair-color of horses, dogs, mice, and other mammals. When we cross two plants in which the leaf-hairs differ, this sort of inheritance often occurs, so that the two kinds of hairs of typical form are scattered over the leaf. (*d*) *Reversion*. This is inheritance from a remote ancestor, or, perhaps, more truly, the absence of typical inheritance. Reversion is often illustrated when two domesticated races of very dissimilar color are crossed. The result may be offspring which resemble neither parent, but are like the ancestral, wild species. It is at present impossible to predict what kind of inheritance will be shown by the qualities of any new cross.

(2) Mathematical Laws of Normal Inheritance. Man, like most other animals, has two parents, four grandparents, eight great-grandparents, sixteen ancestors of the fourth generation, and, generally, $2n$ ancestors of the nth ancestral generation. We inherit not only from our parents, but also from our remote ancestors. The law of inheritance in the case of blending heritage has been worked out by Galton as follows: To the total heritage the parents together contribute 50 per cent.; the four grandparents together, 25 per cent.; the third ancestral generation, $(\frac{1}{2})^3$ or 12.5 per cent.; and, generally, with the nth ancestral generation $\frac{1}{2}n$ per cent. of the total heritage. It is a corollary of this law that the offspring of an exceptional pair will, in the long run, be less exceptional than their parents, unless, which is extremely improbable, their ancestors for six or seven generations have all been as exceptional as the parents. It is because the vast population of one's ancestors is pretty sure to be mediocre that the sons of exceptional parents tend to be less exceptional than they. There is a regression of the progeny toward mediocrity. We can measure this regression (on the average), and say the deviation of the son's stature from the mean will be only 446 + the deviation of the father's stature from the mean, or less than half. From the law of ancestral inheritance we may indeed calculate the relative relationship between two blood relatives in respect to any blending character. This has been done by Pearson in the following table:

Parent	.3000	First cousins	.0750
Grandparent	.1500	First cousins, once removed	.0344
Great-grandparent	.0750	Second cousins	.0172
Great-great-grandparent	.0375	Second cousins, once removed	.0082
Brothers	.4000	Third cousins	.0041
Uncles and nephew	.1500	Great-uncle and nephew	.0625

(3) Special Cases of Inheritance Not Following the Normal Law. The normal law has so far been demonstrated only for cases of blending inheritance. For the other cases our knowledge is almost wholly qualitative. The normal condition of inheritance in these cases may be said to be equal inheritance of any quality from father and mother; or, in the case of alternative heritage, an equal proportion of offspring affected by the two parents. The first deviation from this law is the phenomenon of prepotency, or the excessive inheritance from one parent or one race. It often happens that a certain family characteristic crops out again and again, and in a larger percentage of cases than is called for by the normal law of inheritance. This is most marked when the parents belong to distinct races. Thus, when a common house mouse and a domesticated white mouse are crossed, the offspring are more like the house mouse in color than they are like the tame albinos. Ewart, in crossing horses, found that the male was strongly prepotent. The fact of prepotency is also familiar to plant-breeders who have tried to formulate some of its laws. Thus, it is asserted that the older species, or the more vigorous, is prepotent. 'Sports,' or considerable deviations from the typical condition, are apt to be prepotent. Bell has shown that deaf-mutism is a prepotent quality. The following case of inheritance of syndactylism in man is given by Smith and Norwell, in the *British Medical Journal* for July 7, 1894. Syndactylism, or the growing together of two or more fingers, is a rather rare abnormality. In the diagram ♂ stands for male, ♀ for female, N for normal, and S for syndactylic. Of two parents, the male precedes the female. When the law of normal inheritance calls for 20 per cent. of syndactylic individuals in the latest generations, observation gives 69 per cent.

Another class of exceptions to the normal law of inheritance is that of reversions. When two domesticated races of dissimilar qualities are crossed, the progeny are often unlike either parent, but 'hark back' to some early ancestral condition. The cause of reversion is completely unknown. It is difficult to understand how hereditary qualities can lie so long latent; but the fact has to be recognized.



TELEGONY. An alleged case of irregular inheritance is that known as 'telegony,' or the influence upon subsequent offspring of the first sire. The most famous case is that of Lord Morton's mare. Toward the end of the last century Lord Morton, an Englishman, imported some 'quaggas'—in reality, Burchell's zebra. (See ZEBRA.) One of these was crossed with a pure-blood Arabian mare, which breeds very true, and a hybrid foal was obtained. Subsequently the Arabian mare was crossed with an Arabian horse, and the foal was marked like the hybrid. Another case was that of Mr. Giles's sow, described in the *Transactions* of the Philosophical Society (London, 1821). A black and white Essex sow was mated with a wild boar of a deep chestnut color, and the "pigs produced partook in appearance of both boar and sow, but in some the chestnut color of the boar strongly prevailed" (prepotency of the ancestral race). Later the sow was mated with a boar of her own black and white race, which usually breeds very true, yet the sow produced pigs marked with the same chestnut tint as the pigs of the first litter. Darwin (*Variation of Animals and Plants Under Domestication*, 1868) gives references to other cases. Belief in telegony is widespread among breeders of domestic animals, but it still lacks acceptance among scientific naturalists, chiefly because the possibility of its occurrence is hard to understand.

(4) LIMITS OF INHERITANCE. As we have just seen in regard to telegony, the limits in the capacity for inheritance are uncertain. But more important still is the question of the kinds of qualities which are or are not inherited. All qualities of organisms are classified as innate and acquired. Innate characters are those determined in the fertilized egg; acquired characters are such as affect the organism from without during its development. Innate qualities are, of course, inherited. Whether acquired characters can be inherited is disputed: the whole point at issue is, What are acquired characters? (See LAMARCK; NEOLAMARCKISM: USE INHERITANCE.) The effects of nutrition, which are generally placed in the category of the acquired, are certainly felt in the second generation, especially among plants. But whether the education of a race for many generations eventually so affects the young that they are more docile is, at the present time, doubtful. The characters which are inherited are not only physical, but also mental and moral. The family of Jukes in New York State affords a striking illustration of inheritance of crime. In fact, the majority of crimes against the person are done by members of recognized criminal families. It would be a reasonable measure of self-defense for the State to prevent the marriage of criminals. The strength of inheritance is in some cases stronger than that of environment and nurture. Galton, in his history of twins, tells of identical twins, who, living far apart, fell ill of the same disease at the same time, so exactly were their bodies attuned.

THE PHYSICAL BASIS OF HEREDITY. Although Owen (1849), and afterwards H. Spencer (1866), and Darwin (1868; see PANGENESIS), had suggested that there was a physical basis of heredity, the first one to offer an objective and scientific basis was Dr. G. Jäger, who in 1876 (and more fully in 1878) thus stated his position:

"Through a great series of generations the germinal protoplasm retains its specific properties, dividing in every reproduction into an ontogenetic portion, out of which the individual is built up, and a phylogenetic portion, which is reserved to form the reproductive material of the mature offspring. This reservation of the phylogenetic material I described as the continuity of the germ protoplasm. Encapsuled in the ontogenetic material the phylogenetic protoplasm is sheltered from external influence, and retains its specific and embryonic characters."

It should be observed that Spencer (*Principles of Biology*) based the phenomena of heredity on the supposed presence of 'physiological units,' which he conceived to be immensely more complex than chemical units or molecules. Darwin imagined that the cells of the body throw off minute 'gemmules,' which are dispersed throughout the whole system. But his hypothesis was experimentally disproved by Galton (1875). Nägeli (1884) conceived that in every living cell there are an enormous number of minute particles (micellæ). These correspond to the plastidules of Elsberg and of Haeckel, the 'idioblasts' of O. Hertwig, and the 'biophores' of Weismann. Sedgwick Minot suggested that Nägeli's hypothetical idioplasm, which he (Nägeli) supposed to exist in every living cell, is probably identical with the nuclear chromatin of cells, and that heredity is due to the transfer from parent to offspring of this nuclear substance.

In 1885 were published Weismann's essays on heredity. His view was in the line of Jäger's hypothesis, but greatly expanded, and with many new and original suggestions. He proposed the now famous doctrine of 'the continuity of the germ plasm.' According to his view, "The nature of heredity is based upon the transmission of nuclear substance with a specific nucleoplasm of the germ cell, to which I have

given the name of germ plasm." This germ plasm exists in the nuclei of the reproductive cells.

The word 'continuity' expresses the hypothesis that heredity depends on the fact that a minute quantity of this germ plasm lies unchanged in the nucleus of the reproductive cells during the growth of the plant or animal, and afterwards grows and gives rise to the germ cells. A further elaboration of Weismann's views is not here necessary (see USE-INHERITANCE and WEISMANNISM), but to him we are mainly indebted for the view now generally held, that the germ plasm (chromatin) of the nuclear matter is the bearer of heredity.

The hypothesis seems supported by the experiments of Boveri on the eggs of the species of two genera of sea-urchins. By cross-fertilization of whole eggs or bits of eggs of sea-urchins of different genera having nuclei, larvæ are developed that share the larval forms of the parents of both genera. On the other hand, larvæ arising from the *enucleated* bits of eggs have inherited the characters of the male genus only. Hence he claims to have demonstrated the law that the nucleus alone is the bearer of heredity.

It may be observed that Hertwig, for the germ-plasm theory of Weismann, substituted the theory of the controlling inter-adjustments of the embryonic cells, and later of the tissues and organs.

HOMOCHRONOUS HEREDITY. A form of heredity called by Darwin "inheritance at corresponding periods of life," and by Haeckel "homochronous heredity." Darwin thus describes the phenomenon: "When the embryo leads an independent life, that is, becomes a larva, it has to be adapted to the surrounding conditions in its structure and instincts, independently of those of its parents; and the principle of inheritance at corresponding periods of life renders this possible." (*Variation of Animals and Plants Under Domestication.*) Again: "On this principle of inheritance at corresponding periods, we can understand how it is that most animals display from the germ to maturity such a marvelous succession of characters" (ib.).

Examples of this law are the complicated metamorphosis of certain free, but more especially the parasitic worms, notably the flukeworms (see TREMATODA) and the cestodes (see CESTODA), the complicated metamorphoses of the echinoderms, of the mollusks, crustaceans, and of those insects with a complete metamorphosis, and more especially such insects as the Meloidæ, Rhipiphoridæ, and Stylopidæ, in which there is a hypermetamorphosis.

It is not altogether improbable, says Packard, that the phenomenon of alternation of generations is primarily due to changes in surroundings, and hence of habits, resulting in new needs which were met by adaptation to the new surroundings, and that the different stages were fixed by homochronous heredity.

BIBLIOGRAPHY. Brooks, *The Law of Heredity* (Baltimore, 1883); Cope, *Primary Factors of Organic Evolution* (Chicago, 1896); Darwin, *Variation of Animals and Plants Under Domestication* (London, 2d ed., 1875); Galton, *Hereditary Genius* (London, 1869); id., *English Men of Science* (London, 1874); id., *Inquiries into Human Faculty* (London, 1883); id., *Natural Inheritance* (London, 1889); Hering, *Das Gedächtniss als eine allgemeine Funktion der organischen Materie* (Vienna, 1870); Jäger, *Zoologische Briefe* (Vienna, 1876); id., *Lehrbuch der Zoologie* (Leipzig, 1878); Lucas, *Traité philosophique et physiologique de l'hérédité naturelle* (Paris, 1847); Nägeli, *Mechanisch-physiologische Theorie der Abstammungslehre* (Munich, 1884); Ribot, *L'hérédité psychologique* (3d ed., Paris, Naval. London, 1875); Pearson, *The Grammar of Science* (2d ed., London, 1900); "Mathematical Contributions to the Theory of Evolution," in the *Transactions of the Philosophical Society* (London, 1894-99); "Data on the Problem of Evolution of Man," in the *Proceedings of the Royal Society of London* (London, 1898). A. Weissmann, *Ueber die Vererbung* (Jena, 1883); *Papers on Heredity* (Oxford, 1889); *Amphimixus* (Jena, 1891); *The Germ Plasm* (New York, 1893); "The All-Sufficiency of Natural Selection," in *The Contemporary Review* (London, 1893); *Neue Gedanken zur Vererbungsfrage* (Jena, 1895); E. Haeckel, *Die Perigenesis der Plastidule* (Berlin, 1876). R. Virchow, "Descendenz und Pathologie," in Virchow's *Archiv*, ciii., 1886; Y. Delage, *La structure des protoplasmes et les théories sur l'hérédité* (Paris, 1895); Wilson, *The Cell in Development and Heredity* (New York, 1900); Windle, "Malformations and Heredity," in *Proceedings Birmingham Philosophical Society* (1888); Osborn, *The Cartwright Lectures* (New York, 1892); "Present Problems in Evolution and Heredity," in *Medical Record* (New York, 1892); "The Present Problem of Heredity," in *Atlantic Monthly* (Boston, March, 1891); Packard, "On the Inheritance of Acquired Character in Animals with a Complete Metamorphosis," in *Proceedings American Academy of Arts and Sciences* (Boston, 1894). For the earlier bibliography of heredity, see Thompson, "History and Theory of Heredity," in *Proceedings of the Royal Society* (Edinburgh, 1889). See also the essays of Koelliker, Maupas, Poulton, Driexh, Roux, Turner, Detmer, De Vries, Van Bemmelin, Vines, Le Dantic, Hamilton, Sommer, Ammon, Baldwin, Loeb, Nathusies, Pfeffer, Haacke, Tornier, Eigenmann, Lloyd, Morgan, and Bailey.

HEREFORD, hĕr′e-ford. The capital of Herefordshire, England, a Parliamentary and municipal borough of great antiquity, and an episcopal see; on the Wye, 51 miles south of Shrewsbury (Map: England, D 4). The chief building is the cathedral, dating from 1079, and the fourth church built on the site; it was restored in 1856-63. The chapter-house contains the famous *Mappa Mundi*—map of the world—of the thirteenth century. Other edifices are the bishop's palace, originally a Norman hall; the Coningsby Hospital, 1610; the corn exchange, and the Doric shire hall. Hereford has an endowed grammar school of the fourteenth century. It owns profitable markets and real estate, gas, water, and electric-lighting plant; maintains a fire brigade, free library and museum, and the Castle green. Its industries and trade are chiefly agricultural. The see of Hereford was created in 673; the town was a fortified place in the reign of Athelstan, and numerous charters begin with King John. For its loyalty and sufferings during the Civil War, Charles I. bestowed the motto "Invictæ fidelitatis præmium." Population, in 1891, 20,300; in 1901, 21,400. Consult: Duncumb, *History and Antiquities of Hereford* (Hereford,

1804; new ed., London, 1882); Fisher, *Hereford Cathedral* (London, 1898).

HEREFORDSHIRE. An inland county in the west of England, bounded on the west by South Wales, and on the east by the counties of Worcester and Gloucester (Map: England, D 4). The surface of the county is hilly, with occasional valleys. Among the chief hill-ranges are the Black Mountains on the western, and the Malvern Hills on the eastern border. The Wye and its affluents, with the Lugg, the Arrow, and the Teme, are the principal rivers. Herefordshire is essentially an agricultural county, with four-fifths of its area of 840 square miles under cultivation. Population, in 1891, 115,949; in 1901, 114,400. Capital, Hereford.

Herefordshire formed a portion of the territory of the ancient Silures, and was conquered by the Romans about A.D. 73. During the heptarchy it was included in Mercia. From its position on the Welsh border—a portion of the county being included in the debatable land called the "Marches"—Herefordshire was long the scene of frequent contests.

HEREMANS, hĕr′e-māns, JACOB FRANS JAN (1825-84). A Dutch philologist, born at Antwerp. He studied at the Antwerp Athenæum, and in 1843 was appointed assistant librarian of the city. In 1864 he was appointed professor of the Dutch language and literature at the University of Ghent. He was a specialist also in Flemish literature, and wrote biographies of the Flemish poets Ledeganck (1847) and van Rijswijck (1850), and of the historian David (1868). His other books include: *Nederlandsche dichterhalle* (1858-64); *Hoffmann von Fallersleben en de Nederlandsche letterkunde* (1874); *Over den invloed van Noord-Nederland op de letterkunde in de zuidelijke provinciën gedurende het tijdperk 1815-30* (1874), all on literary topics; and *Nederlandsche spraakleer* (1846); *Nederlandsche metriek* (1862); and his Dutch-French dictionary (1865-69). He founded the *Nederlandsch Museum* in 1874.

HERERO LAND, hâ-rā′rô-lânt, or DAMARALAND. A northern part of German Southwest Africa (q.v.), inhabited by the Herero or Ovaherero tribe.

HERESY (OF. *heresie*, Fr. *hérésie*, from Lat. *hæresis*, school of thought, from Gk. αἵρεσις, *hairesis*, choice, from αἱρεῖν, *hairein*, to take). The name given to religious opinion declared by ecclesiastical authority to be erroneous and contrary to the accepted standards of the Church. In the Septuagint the word is used of the various Jewish parties—Pharisees, Sadducees, and Essenes—and similarly in the Acts of the Apostles. Paul employs it to denote the party divisions into which the Corinthian Christians have fallen, and he rebukes them because they destroy the unity of Christ's flock. Once only in the New Testament (II. Peter ii. 1) has the word its later meaning of *wrong belief*. For some time the boundary line between right and wrong doctrine, orthodoxy and heresy, was not perfectly clear, but a distinction was soon rendered possible by the growth of ancient Catholic Christianity. Before the close of the second century the bishops had begun to test doctrinal soundness by the Rule of Faith (q.v.) and the Canon of Scripture as standards, the interpretation of which was held to rest with themselves. Thus judged, the Gnostics (q.v.) are heretics to Irenæus (180) and Tertullian (c.200).

Beginning with Nicæa (325) the œcumenical councils gave united expression to the doctrinal belief of Christendom, so that the determination of what constituted heresy became much easier than before. With the adoption of Christianity as the State religion under Constantine, the civil Government was led to take cognizance of heresy, on the ground that it imperiled the public welfare. The first Imperial edicts to be mentioned in this connection are those of Constantine against the Donatists (q.v.), in 316. Under succeeding emperors similar decrees become frequent, and increasingly severe. Especially important are the edicts of Theodosius the Great, who in 381 set about enforcing orthodoxy throughout his whole empire. Saint Augustine lent his support to a policy of coercion, and sought to rest it upon the authority of Christ, who said: "Compel them to come in" (Luke xiv. 23). The first Christian to suffer death for his belief, at the hands of fellow Christians, was the Spaniard Priscillian (q.v.), who was charged with holding doctrines akin to those of Manichæism (q.v.). Priscillian was executed at Treves, in 385, by order of the usurping Emperor Maximus. In the sixth century Justinian, the great codifier of Roman law, collected the Imperial edicts against heresy in the first book of his celebrated *Codex*. The spirit which had already taken possession of the Christian Church is well illustrated by the saying of Pope Gelasius I. (492-496): "Toleration of heretics is more injurious than the worst devastation of the provinces by the barbarians."

Anti-heretical laws were more fully developed from the eleventh century onward, when the various sects of the Cathari (q.v.) began to infest Southern Europe. It was in connection with the Albigensian Crusade (see ALBIGENSES), in the thirteenth century, that the Dominican courts of inquisition were established. (See INQUISITION.) During this period the close alliance between Empire and Papacy made it possible for each to aid the other in detecting and punishing offenders. The penalties for heresy included loss of civil rights, banishment, and confiscation of property. In addition, the Church could inflict punishments of her own, such as excommunication. A clergyman, if convicted, could be deposed and degraded from office. Like treason, heresy was construed as a capital offense. But it was an established Catholic axiom that "the Church does not thirst for blood." According to mediæval usage, therefore, a heretic, declared guilty by the ecclesiastical courts, was handed over to 'the secular arm' for execution. The earliest recorded instance of the legal use of burning, as a form of inflicting the death penalty, occurs in Lombardy in 1224. This soon became the favorite method of executing obstinate offenders. The English law, *de hæretico comburendo*, was enacted in 1401, in which year the first burning in England took place. The last execution by this means in England was in 1612.

According to the canon law, 'formal heresy' (*hæresis formalis externa*) exists, in the case of a baptized Christian, when he consciously adopts and persistently maintains an opinion known to be contrary to the doctrinal standards of the Church. What is called 'material heresy' consists in falling into heretical opinion through

ignorance, and this is an offense of far less gravity. Previous to the Protestant Reformation the Church was in a better position to carry out a systematic policy of repression than it has been since. The legalizing of several different ecclesiastical bodies, the growth of toleration, and the final attainment of complete religious freedom in the United States, have effectually removed religious opinion from the jurisdiction of civil government. It remains solely a matter of ecclesiastical discipline. See DISCIPLINE, ECCLESIASTICAL.

Different churches differ widely in the extent to which they attempt to control the belief of their adherents. The most effectual system is that of the Roman Catholic Church, which, in its modern form, goes back to the establishment of the Congregation of the Holy Office in 1542. In general, Roman Catholics are forbidden all *communicatio in sacris* with heretics. For many years (from Urban V. in 1364 to Clement XIV. in 1769) the Papal bull, *In Cœna Domini*, which enumerated the heresies condemned by the Church, was publicly read in Rome on Maundy Thursday. More recently the Pope has sometimes felt compelled to warn the faithful against prevalent error, which, if adopted and persisted in, might become open heresy. Thus Pope Pius IX. published his celebrated *Syllabus of Errors* in 1864, condemning eighty current opinions as erroneous.

Some of the Protestant reformers held almost as stringent views respecting the repression of heresy as did their Catholic contemporaries. Calvin approved the execution of Servetus (q.v.), and Beza and Melanchthon defended it. But most Protestants have gradually tended to rest satisfied with securing, by means of adequate tests, a reasonable degree of theological uniformity among the clergy, trusting the laity to conform their belief to that of their spiritual leaders. Heresy trials have occurred in several denominations in recent times, but their outcome does not encourage the hope that doctrinal agreement can be promoted by such means. The Protestant churches of to-day show an increasing aversion to the thought of trying men for their beliefs, and a desire to emphasize their fundamental principle of the right of private judgment, which was asserted at the Reformation.

BIBLIOGRAPHY. Arnold, *Unparteiische Kirchen- und Ketzerhistorie* (Frankfort, 1699); Burton, *Heresies of the Apostolic Age* (London, 1829), which contains a bibliography; Hahn, *Geschichte der Ketzer im Mittelalter* (Stuttgart, 1846-50); Lea, *History of the Inquisition in the Middle Ages* (New York, 1888); Van Espen, *Jus Ecclesiasticum* (Cologne, 1702), especially on the legal aspects of heresy; Hinschius, *Kirchenrecht der Katholiken und Protestanten* (Berlin, 1869-97); White, *History of the Warfare of Science with Theology* (New York, 1896). See HERETIC.

HERETIC. A person holding an erroneous religious belief or one contrary to the standards of the Church. (See HERESY.) The most important of the individuals and sects commonly classed as heretical may be thus enumerated. The early orthodox writers represent Simon Magus (Acts viii.) as the father of heresies. After him, in the first two Christian centuries, come Menander, Cerinthus, the Ebionites, Nicolaitans, Nazarenes, and Elkesaites (Judaizing parties). In the second century, the Gnostics, Saturnilus, Basilides, Valentinus, Ptolemæus, Marcus and Heracleon; the antinomian sects of Ophites, Cainites, and Sethians, with whom we may class Carpocrates; the representatives of the ascetic tendency, Tatian and the Encratites; Marcion, and his followers, the Marcionites; Montanus and the Montanists; the Alogi, of Asia Minor (who rejected the Logos idea and the fourth Gospel); and among the earlier Monarchians, Theodotus of Byzantium, Theodotus the money-changer, Artemon, Praxeas, and Noëtus of Smyrna. In the third century, Sabellius, Paul of Samosata, Mani (from whom come the Manichæans), Novatian and his adherents. In the fourth century, the Arians (who opposed the Athanasian doctrine of the Trinity), the (schismatic) Donatists, who run over into the fifth century, the Macedonians, and the Apollinarians. In the fifth century, in the East, the Nestorians, Eutychians, Monophysites, and Origenists (all of whom were heterodox in Christology); in the West, the Pelagians and Semi-Pelagians, all of whom were combated by Saint Augustine. The Semi-Pelagians run over into the sixth century. In the seventh century, the Monothelites (logical successors to the Monophysites). In the eighth, the Paulicians of Armenia, descended from an ancient Adoptianist type of Christianity, whose origin is perhaps to be sought in the teaching of Paul of Samosata. In the eleventh century we find the Euchites, inaccurately described as Manichæans. In the twelfth, the Bogomiles, Petrobrusians, Cathari, and Waldenses (the last two having a considerable period of activity). In the thirteenth century, the important and numerous Albigenses. In the fourteenth, the Friends of God and the Brethren of the Free Spirit, and (in England) Wiclif and the Lollards. In the fifteenth, Huss and the Hussites, Taborites, Calixtines, Jerome of Prague, and the Bohemian Brethren. Savonarola (q.v.) was condemned as a heretic.

From the Roman Catholic point of view, the Reformers were heretics. The great change in the ecclesiastical situation wrought in the sixteenth century, and the speedy legalizing of new Church organizations, has made the whole problem of heresy a different one since that time. It is, therefore, undesirable to proceed further with the list. See the various titles mentioned in this article, and, for bibliography, see HERESY.

HERETIC BAPTISM. One of the great questions in the Christian Church of the third century relating to the reception into the Church of those who had been baptized by heretics. Up to that time it would seem that the baptism of such persons had been accepted, and the rite had not been repeated. Clement of Alexandria (d. c.215), it is true, in passing calls 'heretic baptism not proper and true water,' but he does not say that it was invalid, and the universal practice was to consider it valid. But in the early part of the third century Agrippinus, Bishop of Carthage, took opposite ground, influenced perhaps by Tertullian, who says: "Heretics have no fellowship in our discipline. . . Therefore their baptism is not one with ours . . . a baptism which, since they have it not duly, doubtless they have not at all." This Agrippinus presided over a synod held in Carthage between 218 and 222 which pronounced heretic baptism invalid, and the same declaration

was made by two Asia Minor synods held about this time. It then became the practice in Carthage and elsewhere to rebaptize those received into the Church from the heretical sects, on the ground that the baptism which they had received was no baptism.

But the Roman Church, and apparently the majority of the churches in the West, dissented from Agrippinus, considering that the use by heretics of the baptismal formula made their baptism valid; and accordingly, on the ground that baptism was not to be repeated, did not baptize those coming into the Church from heretical sects. In so acting these churches followed precedent, and instituted the practice since followed by the Roman Catholic Church throughout the world.

When Cyprian, the great Bishop of Carthage, came into his see (in the year 248-49) he accepted the view of the Carthaginian Church, and when it was criticised he called synods, in 255 and 256, which formulated this view and enjoined the corresponding practice of rebaptism of converts from the heretics upon the churches. Cyprian sent a report of the doings of the councils to Stephen, the Bishop of Rome from 254 to 257. Pope Stephen refused to confirm the decision of the African synods and wrote back severely reprimanding their action.

The position of Stephen found vigorous supporters and probably little opposition in the Western Church generally. Thus Augustine, Bishop of Hippo (d. 430), the final teacher of the Western Church, lays down the same doctrine, in writing against Petilian, the Donatist: "When the water of baptism is given to any one in the name of the Father, and of the Son, and of the Holy Spirit, it is neither ours nor yours, but His of whom it was said to John, 'Upon whom thou shalt see the Spirit descending, and remaining on Him, the same is He who baptizeth with the Holy Spirit.'"

But Cyprian's view was accepted and defended in many places, and universally by the Donatists, as was natural seeing that their leader and founder was Donatus, the Bishop of Carthage, in 313. So when Augustine entered in debate with the Donatists he devoted an entire treatise to the refutation of Cyprian's position (*De baptismo contra Donatistas*).

The Eastern Church has followed Cyprian rather than Stephen in denying validity to heretical baptism and insisting upon an orthodox interpretation of the baptismal formula. That this was early the case is shown by the remark of Cyril, Bishop of Jerusalem (d. 386): "We may not receive baptism twice or thrice . . . for there is only one baptism . . . heretics, however, are rebaptized since the first [so called] baptism was no baptism;" by the council in the *Apostolic Constitutions*, of uncertain date, but probably prior to the sixth century: "Be ye likewise contented with one baptism alone, that which is into the death of the Lord; not that which is conferred by wicked heretics, but that which is conferred by unblamable priests. . . . Those that receive polluted baptism from the ungodly will become partakers in their opinions;" and yet more strongly by the command in the *Apostolic Canons*, dating from the same period: "If a bishop or presbyter . . . does not baptize him who is polluted by the ungodly [i.e. has received heretical baptism], let him be deprived." Athanasius (d. 373) expressed himself to the same effect: "There are many other heresies too, which use the words [of the baptismal formula], but not in a right sense . . . nor with sound faith, and in consequence the water which they administer is unprofitable, as deficient in piety, so that he who is sprinkled by them is rather polluted by irreligion than redeemed." The voice of the Council of Nicæa (325) is of the same tenor: "With respect to the Paulianists, who wish to return to the Catholic Church, the rule which orders them to be rebaptized must be observed;" but the Council of Laodicea (somewhere between 343 and 381) distinguishes between heretics upon the ground of their position respecting the Trinity, enjoining rebaptism upon those who came into the Catholic Church from the Montanists (canon 8), but not upon those from the Novatians or Quartodecimans (canon 7).

Thus the West universally accepted the teaching of Stephen that where baptism was administered in the name of the Trinity it is valid, while the East qualified it by insisting that the person baptizing must be orthodox as to the Trinity, otherwise the baptism was invalid. The present teaching of Roman Catholics and Protestants is that of Pope Stephen; while in the *Orthodox Confession of the Greek Church* direct mention is made of the necessity of an orthodox interpretation of the formula, and the same is implied in the *Longer Catechism of the Eastern Church*.

HEREWARD, hĕr'*e*-wērd. An English outlaw who has passed into legend as the last champion of Saxon England against the Normans. He was a native of Lincolnshire, and appears in Domesday as the owner of lands in a number of places in that shire. In 1070 Hereward headed a revolt among the inhabitants of Peterborough and with the aid of a Danish fleet burned the town and plundered the abbey. He then retreated to the Isle of Ely, among the fens, where for more than a year he held out against the Normans. Here he was joined by a number of Saxon leaders, among them Morkere the former Earl of Mercia. He was finally driven from his refuge by William the Conqueror. Hereward's subsequent career is unknown, but it would seem that he made his peace with the King, who employed him in his wars in Normandy. The surname of Wake or Watchful dates from a much later period. Charles Kingsley has depicted Hereward as "the last of the English" in his novel, *Hereward the Wake*.

HERFORD, hĕr'fôrt. A town in the Province of Westphalia, Prussia, situated on the Werre, 10 miles from Bielefeld (Map: Prussia, C 2). It is a town of great antiquity and contains an old Münsterkirche begun in the twelfth century, another church dating from the thirteenth century, a gymnasium founded in 1540, and a theatre. The chief manufactures of the town are linen, clothing, chocolate, and confectionery, cigars, tobacco, furniture, etc. The trade is important. Herford is supposed to owe its origin to the convent founded in 822, whose abbess enjoyed a princely rank. The convent was abolished in 1803. Population, in 1890, 19,255; in 1900, 25,109, mostly Protestants.

HER'FORD, Charles Harold (1853—). An English scholar born at Manchester, and edu-

cated at Trinity College, Cambridge, and in Germany. He was appointed professor of English language and literature at University College, Aberystwyth, Wales, in 1887; lectured at Oxford in 1897, at Baltimore and Chicago in 1900, and elsewhere. In 1885 he founded the English Goethe Society. Ripe and painstaking scholarship appears in his contributions to the *Dictionary of National Biography*, in his *Studies in the Literary Relations of England and Germany in the Sixteenth Century* (1886), and *Age of Wordsworth* (1897). His interest in Scandinavian literature led him to several translations, among which are Ibsen's *Brand* in the original metres (1893), and *Love's Comedy* (1900). He also edited the "Eversley" Shakespeare in 1902.

HERGENRÖTHER, hĕr'gen-rē'tĕr, JOSEPH (1824-90). A Catholic theologian of Bavaria. He was born at Würzburg, and studied theology there and in Rome. He became a priest in 1848, instructor at Munich in 1855, and in 1852 professor of Church law and history at Würzburg. In 1868 Pius IX. made him a member of the canonical commission for the Vatican Council. He is best known for his *Anti-Janus* (1870), an answer to Döllinger's *Janus*, and the *Kritik der von Döllingerschen Erklarung vom 28. Marz 1871* (1871), in which he defended the doctrine of the Pope's infallibility. He was made a cardinal in 1879. His historical works are: *Der Kirchenstaat seit der französischen Revolution* (1860); *Photius, Patriarch von Konstantinopel* (1867-69); *Katholische Kirche und Christlicher Staat in ihrer geschichtlichen Entwickelung und in Beziehung auf die Fragen der Gegenwart* (1872-76); *Handbuch der allgemeinen Kirchengeschichte* (last ed. 1884-86); *Kardinal Maury* (1878); *Abriss der Papstgeschichte* (1879); and *Leonis X., Pontificis Maximi, Regesta* (1884-91). Consult: Steiner, "Kardinal Hergenröther," in *Episkopat der Gegenwart* (Würzburg, 1876); and Stamminger, *Zum Gedächtnisse Kardinal Hergenröthers* (Freiburg, 1892).

HER HOR, hĕr hōr, or SMENDES. An Egyptian King, of the twelfth century B.C., founder of the Twenty-first Dynasty, originally chief priest of Ammon. He built much at Karnak, and it was he who stored away the royal mummies discovered by Brugsch Bey in 1881.

HÉRICART-FERRAND, ā'rē'kär' fā'räN', LOUIS ETIENNE FRANÇOIS, Vicomte de Thury (1776-1854). A French engineer and agriculturist, born in Paris, and educated there, at the School of Mines. From 1809 to 1830 he was inspector-general of quarries, and for the last seven years of this period was director of works. In agriculture he made a special study of irrigation. He was a Deputy in 1815-27, and in 1824 was elected to the Academy of Sciences. Besides contributions to the *Journal des Mines* (1799-1815), to the *Annales des Mines*, and to the *Annales de la Société d'Horticulture*, his principal works were: *Descriptions des catacombes de Paris* (1815); *Considérations sur les puits forés* (2d ed. 1829); and *Du desséchement des terres cultivables* (1831).

HÉRICAULT, ā'rē'kō' (DE RICAULT), CHARLES JOSEPH (1823—). A French historian and romancer, born at Boulogne-sur-Mer. He began his literary career by writing for the *Revue des Deux Mondes* and other journals, and for seven years (1883-90) he conducted one he had himself founded, the *Revue de la Révolution*. His novels include: *La fille aux bleuets* (1860); *Un gentilhomme catholique* (1863); *La reine sauvage* (1869); *Les cousins de Normandie* (1874); *Le premier amour de lord Saint-Albans* (1879); *Le dernier amour de lord Saint-Albans* (1879); and *Aventures de deux Parisiennes pendant la Terreur* (1881); while the best of historical work is to be found in *Origine de l'épopée française et son histoire au moyen âge* (1860); *La France guerrière* (1867); *Histoire nationale des naufrages et aventures de mer* (1870); *Thermidor, Paris en 1794* (1872); *La Révolution, 1789-1882* (1882). He also edited the works of Gringoire, Clément Marot, and Charles d'Orléans.

HERING, hā'rĭng, CONSTANTIN (1800-80). A German-American physician. He was born in Oschatz, Saxony; studied medicine and surgery at Leipzig, Würzburg, and Dresden, and soon afterwards became a convert to homeopathy. In 1833 he emigrated to America, and settled in Philadelphia, where he founded the first American homeopathic school, and from 1845 to 1860 was professor of the institutes of medicine and materia medica in that institution. He was the editor of several homeopathic magazines, and published a number of books, including: *Rise and Progress of Homœopathy* (1834); *Effects of Snake Poison* (1837); and *Guiding Symptoms and Analytical Therapeutics* (1875).

HERING, EWALD (1834—). A German psychologist and physiologist. He was born at Alt-Gersdorf in Saxony, on August 5, 1834; practiced medicine in Leipzig in 1860, and became docent in physiology at the university there in 1862. Three years later he was appointed professor of physiology at the medico-surgical Josephs-Akademie, Vienna. From 1870 to 1895 he occupied a similar position at the German University at Prague, and in 1895 he was called to Leipzig. Hering's publications are many of them of unusual scientific merit and importance. Best known are: *Beiträge zur Physiologie* (1861); *Die Lehre vom binocularen Sehen* (1868); *Ueber das Gedächtnis als eine allgemeine Funktion der organisierten Materie* (1870; Eng. trans., *On Memory as a General Function of Organized Matter*, 1897); *Grundzüge einer Theorie des Temperatursinnes* (1877); *Zur Lehre vom Lichtsinne* (1878); "Raumsinn des Auges —Augenbewegungen" (1879), "Temperatursinn" (1880), both in Hermann, *Handbuch der Physiologie; Ueber Newtons Gesetz der Farbenmischung* (1887); *Zur Theorie der Nerventhätigkeit* (1899).

Hering has won a high place among psychologists by his contributions to psychophysics. His name is especially associated with four features of this science, by (1) his investigations into visual space perception, wherein he argued for the nativistic or physiological theory against the 'empiristic' position of Helmholtz; (2) his treatise on memory as a general function of organized matter; (3) his attack upon Fechner's 'fundamental law of psychophysics,' otherwise known as 'Weber's law;' and (4) his theory of color vision, which stands out in sharp rivalry with that of Helmholtz. Nearly all subsequent theories may be regarded as improvements upon, or modifications of, these two theories. Hering's cardinal postulates are: (1) An independent brightness process (grays); (2) a paired ar-

rangement of the constituent processes (white-black, red-green, yellow-blue); and (3) an antagonistic relation between the colors of each pair. The advantages of this theory as an explanation of the psychological phenomena of vision have won for Hering the support of the great majority of psychologists.

HERING, Rudolph (1847—). An American engineer, born in Philadelphia. He graduated at the Polytechnic School in Dresden, Germany, and from 1868 on was employed in important engineering work, among other offices holding those of engineer in charge of the water-supply for Philadelphia and Chicago. In 1881 he prepared, for the National Board of Health, a comprehensive report on the sewerage of European cities.

HERINGSDORF, hā'rings-dōrf. The principal German summer resort on the Baltic coast, situated on the island of Usedom in the Prussian Province of Pomerania, 40 miles from Stettin (Map: Germany, F 2). It is a picturesque place with numerous fine villas and hotels, and is visited by about 13,000 people in the season. Population, in 1900, 874.

HERIOT (AS. *heregeatu*, military apparel, from *here*, Goth. *harjis*, OHG. *heri*, Ger. *Heer*, OChurch Slav. *kara*, OPruss. *karjis*, OPers. *kāra*, army + *geatu*, equipment). In old English law, a customary tribute of goods and chattels, payable to the lord of the fee on the death of a freehold tenant. It may have had its origin in the practice of returning to the lord the martial equipment which he had furnished to his vassal. But in course of time it came to be regarded as a form of relief (q.v.), payable by the heir on succeeding to the inheritance, as a sort of inheritance tax or death duty. If a vassal fell in battle in the service of his lord, no heriot was demanded. As heriots were due only of tenants who held by knight's service, they disappeared with the abolition of military tenures. Nominally, however, the right still exists in England in connection with copyhold estates, but it is in practice obsolete. See Tribute.

HERIOT, hĕr'ĭ-ot, George (1563-1624). A Scottish goldsmith and philanthropist, founder of Heriot's Hospital, Edinburgh. He was the son of a goldsmith of Edinburgh, and followed his father's business. In 1597 he was appointed goldsmith to Anne of Denmark, consort of James VI. of Scotland, and four years afterwards to the King, on whose accession, in 1603, to the English throne Heriot went to London, where as Court jeweler and banker he amassed a large fortune. Of this he left £23,625 to the town council of Edinburgh for the education of the children of decayed burgesses and freemen of that city. According to his will, the hospital or school which he wished to found was to be in imitation of Christ's Hospital, London. The school was opened in 1659; in 1885 it was reorganized for secondary and higher branches. In 1902 the funds yielded upward of £50,000, and besides supporting the original foundation, furnished many scholarships at the Heriot-Watt College, the university, and other schools of Edinburgh. Heriot figures as "Jingling Geordie" in Scott's *Fortunes of Nigel* (Edinburgh, 1822).

HERIOT, George (1766-1844). A Canadian official and author, born on the Isle of Jersey. In 1799 he was at Quebec, in the Ordnance Department. The following year he was appointed Deputy Postmaster-General, and held the position for six years. He turned soldier during the War of 1812, was next in command to De Salaberry at the battle of Chateauguay, and in 1841 was made a major-general of militia. He represented Drummond County (1830-34), and wrote a *History of Canada* (2 vols., 1804), wherein he is largely indebted to Charlevoix, as well as *Travels Through the Canadas* (1807).

HERIOT, John (1760-1833). A Scotch author, born at Haddington. He was educated at Edinburgh High School and University, but left without graduating, on account of lack of means, and went to London. Here he entered the marine service, was made a lieutenant at the age of eighteen, was in several of the naval engagements of the period, and was wounded in Rodney's famous fight with the French (April 17, 1780). When the war was over, Heriot was retired upon half pay, which he supplemented by making light literature out of his heavy experiences, such as *The Sorrows of the Heart* (1787), and *The Half-Pay Officer* (1789); but more important is his *Account of Gibraltar* (1792). After starting and editing two newspapers, he retired into Government positions, and from 1810 to 1816 lived in Barbadoes as deputy paymaster-general of the troops in the Windward and Leeward Islands. The last seventeen years of his life he spent in Chelsea Hospital, where he was comptroller.

HERI-RUD, hĕr'ê-rōōd' (Lat. *Arius*). A river of Central Asia, rising in the Koh-i-Baba range of the Hindu Kush Mountains, 150 miles west of Kabul (Map: Afghanistan, H 4). It flows through Afghanistan, for more than 300 miles through a fertile and beautiful valley past Herat; then, bending suddenly to the north, it flows along the Persian boundary, and afterwards northwest through Turkestan, making a farther course of 400 miles, till it terminates in the swamp of Téjend. After entering Turkestan, the Heri-Rud assumes the name of Tejend. Its chief tributary is the Keshef from the west.

HERISAU, hā'rê-sou. A town of Switzerland, in the Canton of Appenzell, situated near the river Glatt, six miles southwest of Saint Gall (Map: Switzerland, D 1). The town is irregularly built, has a church-tower reputed to date from the seventh century, a public library, an arsenal, a new town house, and a hospital. The manufactures comprise muslin, cotton, and silk. In the vicinity are iron springs. Population, in 1900, 13,497. Herisau was known early in the ninth century, and was ruled by the abbots of Saint Gall till the middle of the fifteenth, when it entered the Swiss Confederation.

HÉRISSON, â'rê'sôn', Maurice, Count (1840-98). A French officer and publicist, born in Paris. He entered the army, and took part in the Italian campaign and in the Chinese War, under General Montauban. In 1869 he was sent to America to make statistical studies. He returned to France at the outbreak of the Franco-Prussian War; was on the staff of General Schmitz, and later an ordnance officer under General Trochu, and was present at the interview between Bismarck and Jules Favre at Ferrières. In 1875 he was sent on an archæological expedition to Tunis, and in 1891 was made head of the French militia in Congo. His main works are: *Etudes sur la*

Chine contemporaine (1864); *L'esprit chinois et l'esprit européen* (1869); *Journal d'un interprète en Chine* (1885); *Journal de la campagne d'Italie* (1889); and *Les responsabilités de l'année terrible* (1891).

HERISTALL, hĕr'ĭ-stăl. A town in the Province of Liège, Belgium. See HERSTAL.

HERITABLE BOND, or HERITABLE SECURITY. In Scottish law, a bond or other obligation secured by a pledge or conveyance of heritable, i.e. real, property. In modern times it has taken on the form of the English and American mortgage of real property. See MORTGAGE.

HERITABLE JURISDICTIONS. A remarkable class of criminal jurisdictions held hereditarily from the Crown of Scotland. These jurisdictions amounted to upward of a hundred in number, and consisted of sheriffships, stewartries, constabularies, but principally of regalities and bailleries, with some offices of distinction. One of the more important was the office of the Lord Justice-General, and the Lordship of Argyle and the Isles, both belonging to the family of Argyle. In virtue of their hereditary rights the possessors of these jurisdictions exercised an arbitrary power over vassals and others within the limits of their domain, and could punish them by fines, scourging, imprisonment, and even in some cases put them to death, without interference of the common law. As repugnant to social policy, and more particularly with the view of extinguishing the authority of Highland chiefs over their clans, these heritable jurisdictions were abolished by act of Parliament in 1747 (20 Geo. II., c. 43), the possessors receiving payment for the estimated value of their rights. The abolition of these jurisdictions was followed by the appointment of sheriffs and the placing of the administration of the law in Scotland upon a uniform and modern basis. Consult Hume, *Commentaries on the Law of Scotland Respecting Crimes* (Edinburgh, 1844).

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